UNIVERSITY OF MICHIGAN
JUL 1 1953
MEDICAL LIBRARY

The Journal of the International College of Surgeons

FOUNDED BY DR. MAX THOREK

Vol. XIX *April, 1953* No. 4

Will you and your family be in SAO PAULO in April 1954?

Many of your colleagues and friends will be attending the

NINTH BIENNIAL CONGRESS

OF THE

INTERNATIONAL COLLEGE OF SURGEONS

SAO PAULO, BRAZIL

APRIL 21-26, 1954

Outstanding medical programs insure "one of the greatest surgical gatherings ever held."

SPECIAL FEATURE

400th Anniversary of the Founding of the City of Sao Paulo

Year long festivities, the results of plans started many months ago, will attract visitors from all over the world. Will you be among those joining with the people of "the Chicago of South America" in celebrating this anniversary?

CHOOSE THE LUXURY CRUISE-TOUR OR ONE OF THE AIR TOURS . . . OR COMBINE THE TWO FOR THE ULTIMATE IN PLEASURE TRAVEL.

Reservations, information from

INTERNATIONAL TRAVEL Service Inc

PALMER HOUSE

119 SOUTH STATE STREET CHICAGO 3, ILLINOIS

Financial 6-3750

Official Travel Representative for the Ninth Biennial Assembly

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Editor-in-Chief
MAX THOREK, M.D., Sc.D., LL.D., F.B.C.S., F.I.C.S., F.P.C.S. (Hon.), F.R.S.M.

Assistant to the Editor
Dorothy Langley

Production Assistant
Dora Stone

Publication Committee

Francisco Graña, M.D., *Chairman*
Rudolph Nissen, M.D.
Henry W. Meyerding, M.D.
Max Thorek, M.D., *Editor-in-Chief*
Arnold S. Jackson, M.D.
Edward L. Compere, M.D.

Summary Editors

Dr. Manuel A. Manzanilla, Jr., Chicago
Spanish
Dr. F. Luz Filho, Salvador, Bahia, Brazil
Portuguese
Dr. Fritz Rothbart, Chicago
German
Dr. Jean Paul Le Gault, Montreal
French
Dr. Antonello Franchini and
Dr. Marino Mini, Bologna
Italian

CONTENTS—APRIL, 1953

Primary Tumors of the Retroperitoneum: A Clinicopathologic Analysis of 162 Cases; Review of the Literature, and Tables of Classification 401
M. M. Melicow, M.D., New York, New York

Schwannoma of the Pharynx: Report of a Case and Review of the Literature 450
Paul Guggenheim, M.D., Topeka, Kansas

Treatment of Angioneurotic Edema with Etamon-Benadryl Combinations 475
John M. Hammer, M.D., F.A.C.S., F.I.C.S., Kalamazoo, Michigan

Transection and Repair of the Vena Cava Above the Renal Veins During Removal of a Teratoma 478
Shattuck W. Hartwell, M.D., Ph.D., F.A.C.S., D.A.B.S., Muskegon, Michigan

UNIVERSITY OF MICHIGAN LIBRARIES

Saddle Block Anesthesia in Obstetrics 482
Eugene A. Conti, M.D., F.A.C.S., F.I.C.S., and Daniel E. Natali, M.D., Pittsburgh, Pennsylvania

Transverse Colostomy for Ulcerative Colitis 488
Frederick B. Campbell, M.D., F.A.C.S., F.I.C.S., and Ralph B. Samson, M.D., Kansas City, Missouri

Neonatal Bleeding and Cerebral Birth Palsy 494
Samuel Rosner, M.D., F.I.C.S., New York, New York

The Clinical Management of Pruritus Ani 505
Lawrence S. Mann, M.S., M.D., F.A.C.S., F.I.C.S., Chicago, Illinois

Fat Embolism: Its Relation to Intramedullary Nailing 508
Carlo S. Scuderi, M.D., Ph.D., F.A.C.S., F.I.C.S., Chicago, Illinois

Traumatic Laceration of Stensen's Duct Producing Intermittent Obstruction 513
Joseph Hersh, M.D., F.A.C.S., F.I.C.S., Pittsburgh, Pennsylvania

EDITORIALS

The Ninth International Congress in São Paulo 517

Homeless 520

SECTION NEWS 522

GENERAL NEWS NOTES 525

NEW BOOKS 528

ABSTRACTS FROM CURRENT LITERATURE 530

COLLEGE INTERNATIONAL DES CHIRURGIENS

FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XIX APRIL, 1953 No. 4

Original Articles

Primary Tumors of the Retroperitoneum

A Clinicopathologic Analysis of 162 Cases
Review of the Literature and Tables of Classification

M. M. MELICOW,* M.D.

NEW YORK, N. Y.

THE majority of retroperitoneal tumors remain undetected until too late for adequate treatment. Since such neoplasms are not uncommon, it is important to emphasize significant clinical symptoms and objective signs as aids in earily diagnosis. The pathologic classification, rate of growth and degree of malignancy of retroperitoneal masses are not generally known, and need to be clarified. With the foregoing considerations in mind, I present a study of 162 cases of primary retroperitoneal tumors, obtained from the files of the Squier Urological Clinic, Presbyterian and Babies Hospitals of New York.

The Retroperitoneum. — The retroperitoneum is bounded anteriorly by the posterior layer of the parietal peritoneum, the posterior surfaces of the liver, the pancreas, and portions of the large intestine. Posteriorly the area is limited by the fascial coverings of the anterior aspects of the lumbar verterbrae, the psoas muscles, the quadratus lumborum muscles and parts of the transversalis muscles (Fig. 1). The retroperitoneum extends cephalad to the diaphragm and its attachments, and its caudal boundary is formed by the pelvic fasciae covering the levatores ani and the

*Assistant Clinical Professor, College of Physicians and Surgeons, Columbia University; Uropathologist, Squier Urological Clinic, Presbyterian Hospital, New York.

Read at the Seventeenth Annual Congress of the United States and Canadian Sections, International College of Surgeons, September 1952.

Aided by funds furnished by Mr. J. Given Sr. and Mrs. H. S. Hirschhorn.

Submitted for publication Feb. 00, 1953.

UNIVERSITY OF MICHIGAN LIBRARIES

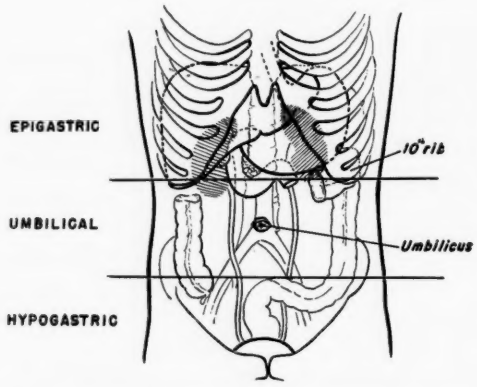


Fig. 1.—Relation of abdominal viscera to the retroperitoneum at various levels: In the epigastric zone it embraces the posterior surface of the liver, kidneys, adrenals, pancreas and portions of the duodenum. The stomach and transverse colon and their mesenteries also occupy this zone. In the umbilical region the retroperitoneum is framed by the posterior surfaces of the ascending and descending portions of the colon and is traversed by the ureters. The mesentery of the small intestine traces a diagonal line downward to the right, and the loops of the small intestine are the anterior neighbors. In the hypogastric zone, the posterior surface of the sigmoid and its mesentery and the posterior surface of the rectum are in direct contact. The aorta, the inferior vena cava and their tributaries course through the various zones of the retroperitoneum.

coccygeus muscles. A line drawn from the tip of the twelfth rib to the midpoint of the iliac crest marks the lateral boundary. The retroperitoneum is partly an *actual* and partly a *potential* space. Included in the actual retroperitoneal space are the abdominal portion of the aorta, the inferior vena cava, the pancreas, the duodenum, the adrenal gland and the kidney and ureters. Discussions of retroperitoneal tumors usually *exclude* neoplasms that arise within these structures or organs. The *potential* space lies in the same plane as the actual space but includes only the fibrous and areolar tissues, fat, fine muscle bundles, small blood vessels, capillaries and nerve elements. Its greatest expanse is caudal to the level of origin of the mesentery (Fig. 2). The potential retroperitoneal space includes the crevices between the peritoneal leaves of the various intraabdominal mesenteries, since they are anatomically extensions or continuations of the retroperitoneum. The term "retroperitoneal tumor" is most often employed to denote a mass that has arisen in, metastasized to or invaded the *potential space* and converted it into an actual space.

In conclusion, under the heading of primary neoplasms of the retroperitoneum one usually includes only those that arise from the tissues occupying the potential space. In a sense the adrenal, kidney, pancreas, liver, spleen, etc., are also retroperitoneal organs, but neoplasms of these organs are usually discussed under their individual headings. Snyder and his coworkers, however, included Wilms' tumor and neuroblastomas of the adrenal in their report on retroperitoneal tumors in children.[1] Neoplasms arising from the renal capsule, though extrinsic to the kidney, are included under *"perirenal"* tumors. This is to distinguish them from the true retroperitoneal tumors which are also called "pararenal"; i. e., in relation to the kidney. It is admittedly difficult, indeed at times impossible, to determine the site of origin when a perirenal growth has burst through boundaries into the retroperitoneum, and vice versa when a retroperitoneal tumor has flooded the kidney.[2]

Table 1 contains a classification of the retroperitoneal tissues and of some of their respective neoplasms.

Symptoms and Diagnosis.—The retroperitoneum is clinically "silent" for a long time and is an ideal site for the continued, unhampered multiplication of cancer cells. Neighboring structures, such as the kidney and ureter or those within the peritoneal cavity or the pelvic basin, for a long time yield to the expansion of the neoplastic mass without significant change in their own function or form. The tumors can thus grow to an extraordinary size. Some almost fill the entire abdomen and even extend into the inguinal canals, labia, buttocks or obturator foramen (Fig. 3).

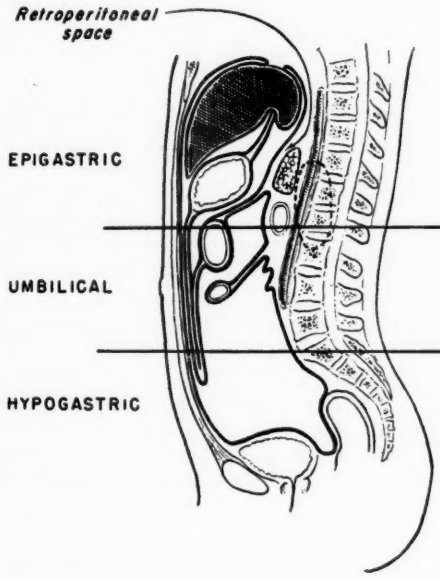
Many patients with retroperitoneal tumors go without symptoms for a long time and then show only vague ones. They eventually seek aid from that surgeon

specialist to whose field the preponderance of symptoms points. When the complaints are referred to the gastrointestinal tract, it is usually the general or abdominal surgeon who does the exploring; the gynecologist probes when the symptoms and mass are suggestive of pelvic pathologic change, and the urologist investigates when evidence of obstruction of the urinary tract is demonstrated.

In many cases operation comes too late and the surgeon has to content himself with biopsy of an extensive nonremovable mass. Indeed, the retroperitoneum, starting out as a haven for cancer cells, continues for a time as a silent "no man's land" and frequently ends as the surgeon's Waterloo. Thus, it is important that one acquaint himself with the life cycles of these remarkable tumors. Their biologic course and their static or expansive or invasive properties vary considerably. Some are benign and are cured by simple excision; some are histologically benign but clinically malignant; others grow slowly but tend to recur and invade locally. Some of these neoplasms are furiously malignant from the start and defy all measures aimed at their eradication.

A retroperitoneal tumor tends to expand steadily during the silent latent period. Anteriorly the soft yielding abdominal viscera are at first displaced without noticeable disturbance in function or significant alteration in form. A vague feeling of abdominal fullness or discomfort may later be noted as the abdomen enlarges. Eventually most patients suffer from nausea, vomiting, cramps, diarrhea, constipation or large hemorrhoids. In late stages ascites, dyspnea, hematemesis, bloody stools, or partial or complete intestinal obstruction may develop (Fig. 2).

Posteriorly, the unyielding musculature



RETROPERITONEAL TUMORS

	SYMPTOMS	SIGNS
EPIGASTRIC	backache radicular pain pleuritic pain, dyspnea abdom. fullness cramps epigastric distress nausea, vomiting jaundice, hematemesis	abd. mass high diaphragm ± fluid liver, duoden., pancreas, stom. or kidney(s) displaced (I.V.P., retrograde, G.I. series etc.)
UMBILICAL	as above ± girdle pain abd. varices constipation pain ± edema lower extrem. urinary tract obstruction	as above ± colon, sigmoid, loops of small intestine displaced (Barium Enema) displacement of kidney ± ureter
HYPOGASTRIC	as above ± low backache, "sciatica" hemorrhoids bloody stools frequency, dysuria, hematuria sympt. referable to gyn. tract.	as above ± rectal "shelf" or mass, above prostate uterus and/or adnexae displ. bladder compressed

Late: anorexia, loss of weight, weakness, chills, fever, anemia, ± ascites, partial to total intest. obstruction, uremia, paraplegia, extension and/or metastases.

Fig. 2.—Relation of site and duration of retroperitoneal tumors to signs and symptoms.

presents an efficient barrier to the expanding mass. The patient may complain of vague "backache." In the advanced stages, particularly of invasive malignant tumor, severe radicular girdle pains appear. Pains radiating down one or both lower extremities suggest pressure on, or invasion of, lumbar or sacral nerves. Similar involvement of retroperitoneal blood vessels or lymphatics may produce unilateral or bilateral varicosities, edema or changes in surface temperature.

Displacement of the kidney or ureter and the direction of such displacement depend on the original location of the retroperitoneal tumor and the direction of its spread — i. e., whether cephalad or caudad, medial or lateral. The kidneys and ureters are good neighbors and give way to crowding by an aggressive mass (Fig. 3). Frequency of urination and hematuria appear late, and anuria may occur in the terminal stages. Pressure against the bladder can cause urgency and dysuria.

Fig. 3.—Enormous retroperitoneal lipoma weighing at least 179 pounds (81.2 Kg.) and possibly 275 pounds (127.7 Kg.). (Reproduced from a paper by Delamater in the Cleveland Medical Gazette.) This case was referred to by Dr. A. P. Stout in his article *Liposarcoma—The Malignant Tumor of Lipoblasts*, which appeared in the *Annals of Surgery* in 1944.

The spleen may be displaced anteriorly, giving difficulty in differential diagnosis. A left-sided retroperitoneal tumor may for a time suggest duodenal ulcer, colitis, tumor or diverticulitis of the large intestine. A right-sided one may simulate hepatic or cholecystic disease. Clinically it is sometimes difficult to tell retroperitoneal tumors from those of the kidney or adrenal gland, and lesions of the enigmatic pancreas offer great difficulty in recognition.

Diagnosis.—Physical Signs: The most frequent single physical sign in this series was a painless abdominal mass (Fig. 2). This unfortunately occurred late in the life cycle of most retroperitoneal neoplasms. The mass varied considerably in size, and at times the degree of malignancy did not run parallel with the size of the neoplasm. Mobility and ballottement were associated with benign tumors and cysts; fixation with malignant growths. Edema of the lower extremities and/or paraplegia occurred in some advanced cases. Weight loss, weakness, fever, and anemia came late (Fig. 2). An abdominal mass, distended superficial abdominal veins, fever and anemia were frequently observed in children.

Roentgenologic Studies: Gastrointestinal Tract. The stomach may be displaced forward or upward and perhaps directed transversely (Fig. 2). The duodenum and the transverse portion of the colon may be displaced forward or downward. Segments of the small intestine may be pushed to one side. The barium enema may show anterior and lateral displacement of bowel.[3]

(a) A plain roentgenogram of the abdomen may reveal a soft tissue shadow and at times indicate an alteration in size, shape and position of the renal shadow (Fig. 5). Additional shadows cast by calcified elements in the mass may be detected.

(b) A *normal* pyelogram and urterogram in a *normally placed,* normally shaped kidney and ureter are presumptive evidence against the presence of an intrinsic renal neoplasm. Such evidence,

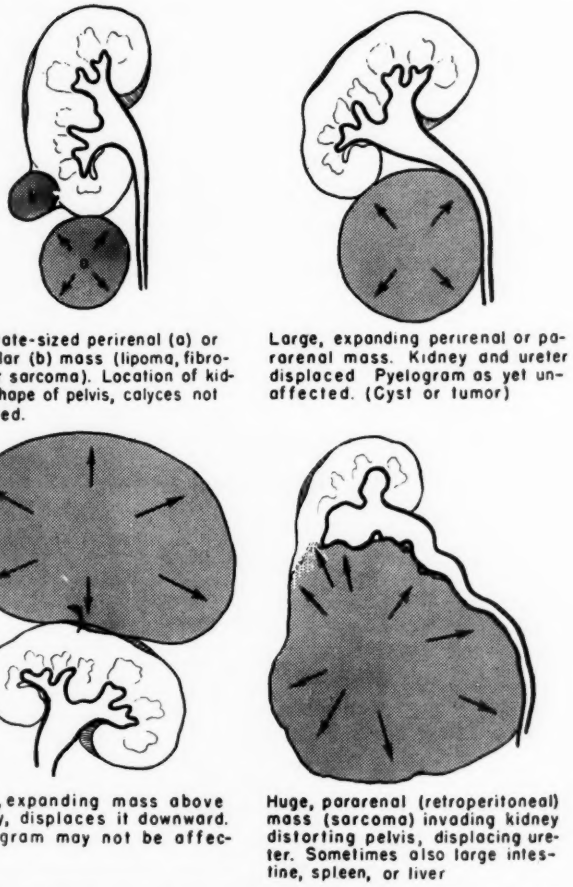

Moderate-sized perirenal (a) or capsular (b) mass (lipoma, fibroma, or sarcoma). Location of kidney, shape of pelvis, calyces not affected.
Large, expanding perirenal or pararenal mass. Kidney and ureter displaced Pyelogram as yet unaffected. (Cyst or tumor)
Large, expanding mass above kidney, displaces it downward. Pyelogram may not be affected
Huge, pararenal (retroperitoneal) mass (sarcoma) invading kidney distorting pelvis, displacing ureter. Sometimes also large intestine, spleen, or liver

Fig. 4.—Tumor masses in relation to the ureter. The ureter is the "*weather vane*" of the retroperitoneum. The direction of its displacement and distortion, provided they are constant, are indicative of the presence and extent of expansion of a retroperitoneal mass. The kidney and ureter are good neighbors and give way, for a long time, to an expanding tumor. Hydronephrosis and hydroureter come late and usually indicate compression and infiltration.

however, does not rule out an extrinsic (perirenal) or retroperitoneal growth.

(c) Distortion of the pyelogram or ablation of some or all calyces or parts of the pelvis in a normally shaped or enlarged or irregular kidney, *without displacement*, usually occurs in association with intrinsic pathologic change, such as a neoplasm arising in the pelvis, the cortex or the medulla.[4]

(d) A normal pyelogram, in a normally shaped but *displaced kidney* and *displaced ureter*, is seen in association with a *slowly expanding* retroperitoneal mass (benign tumor or early malignant tumor). Schulte and Emmett[5] observed renal and ureteral displacement in 72.5 per cent of the cases of retroperitoneal tumor which they studied. Often there was *no distortion of the pyelogram* (Fig. 4).

TABLE 1.—*Tumors and Lesions of the Retroperitoneum*

Type of Tissue	*Benign Tumors*	*Malignant Tumors*
Fibrous	Fibroma	Fibrosarcoma
Adipose	Lipoma	Liposarcoma
Mucoid	Myxoma	Recurrent myxoma
Muscle	Leiomyoma	Leiomyosarcoma
	Rhabdomyoma (?)	Rhabdomyosarcoma
		Myoblastoma
		Hemangioendothelioma
Vascular	Hemangioma	Hemangioendothelioma
	Benign pericytoma	M. hemangiopericytoma
Mesenchymal	?	Mesenchymoma
Lymphatic	Lymphangioma	Lymphangiosarcoma
Lymph, etc.	?	Lymphosarcoma
		Hodgkin's disease
Peritoneal (mesothelial)	B. mesothelioma	M. mesothelioma
Nerve elements	Neurilemoma	M. Schwannoma
	Ganglioneuroma	Partially differentiated ganglioneuroma
		Sympathicoblastoma
		Chordoma
Extra-adrenal chromaffin tissue	Extra-adrenal pheochromocytoma	M. extra-adrenal pheochromocytoma
	(?) Nonchromaffin paraganglioma	(?) M. nonchromaffin paraganglioma
Cell rest: totipotent cell remnant	Dermoid cysts (wolffian, mullerian) adenoma	Teratoma
Gland tissue	Adenoma	Carcinoma
Reticulo-endothelial (?): (?) neoplasm	Xanthoma	Xanthosarcoma (?)
Constitutional dyscrasia:	Xanthomatosis	
Local infiltration:	Xanthomatous infiltration	
Inflammation:	Xanthogranuloma	
Hemorrhage: hematoma (rupture of aneurysm of aorta etc., periarteritis nodosa, etc.), hygroma, leukemic tumor, etc.		
Infiltrations: Inflammatory lesion: walled-off abscess, parasitic cysts, etc.		

(e) *Hydroureter* and *hydropelvis*, in an *irregularly* enlarged *displaced* kidney, with a constricted, *displaced* ureter, are usually seen in association with an advanced invasive retroperitoneal mass. The pyelogram may show distortion and partial ablation, depending on extent of invasion (Figs. 4, 5*A* and 7). Lateral studies and aerograms aid in further establishing the relation of the kidney to the retroperitoneal mass.[6] *Local Arterial Tree.* This can be investigated by aortographic means. *Chest.* A high diaphragm is often associated with a large retroperitoneal tumor, or with one that has arisen in the subdiaphragmatic region. Evidence of pleuritic irritation or fluid suggest extension. The presence of metastases can be detected by significant shadows.

Presacral retroperitoneal pneumograms, usually obtained simultaneously with retrograde pyelograms, are a great aid in delineating the extent of retroperitoneal tumors and their relationship to neighboring organs or structures[7] (Fig. 5*B*).

TUMORS OF THE RETROPERITONEUM

A total of 162 cases of retroperitoneal tumors and cysts were studied and are tabulated in Table 2. The lymphomas (48 cases) were the most numerous; next in frequency were the lipomatous group (20 cases). The muscle tumors totaled 18, as did the nerve tissue tumors. There were 12 neoplasms of fibrous tissue origin, and the chromaffin group totaled 9. There were 10 cysts and 5 teratomas. The remainder,

22, were a miscellaneous group.

Tumors of Fibroblasts.—Of these there were 12, 1 fibroma and 11 fibrosarcomas; 7 of the patients were male and 5 female, aged respectively, 5, 22, 40, 44, 45, 46, 47, 48, 52 and 60.

Fibroma: Only a few references to simple retroperitoneal fibromas appear in published reports.[8] Stout[9] mentioned Koch's case (1928) of a tumor weighing 10 Kg. in the right iliac fossa of a 37-year-old woman. The majority show myxomatous components. Two of 8 fibroblastic tumors observed by Pack and Tabah[10] were benign; the remainder were malignant. There was 1 fibroma in the present series. The patient, a 39-year-old woman, had an ovoid, smooth mass in the posterior cul de sac, which, when removed, proved to be a fibroma 6.5 cm. in diameter.

Fibrosarcoma: Eight fibrosarcomas were observed by McNamara, Smith and Boswell[8d] in a series of 2,500 consecutive autopsies. Stout, however, expressed the opinion that "not one of the cases is above suspicion of being leiomyosarcomas, liposarcomas or something else.[11] True fibrosarcomas tend to infiltrate slowly and steadily so that there may be an interval of years between removal and recurrence or rapid progression. The less differentiated tumors show rapid growth, bizarre cell formation, numerous mitoses and the formation of fewer connective-tissue fibers as shown by reticulin stains. Fibrosarcomas show little tendency to metastasize.[12]

There were 11 cases of fibrosarcoma in this series; 7 of the patients were male and 4 were female. Table 3 is a summary of these cases.

Lipomatous Tumors. — There were 20 cases in this category, with 6 lipomas and 14 liposarcomas; 8 of the patients were male and 12 were female.

The principal sites of fatty tumors, according to Willis,[13] are the subcutaneous tissues of the limbs or trunk, the *retroperitoneal tissues* and the inguinal canal. Stout[14] stated that the commonest site of liposarcoma is in the retroperitoneal tis-

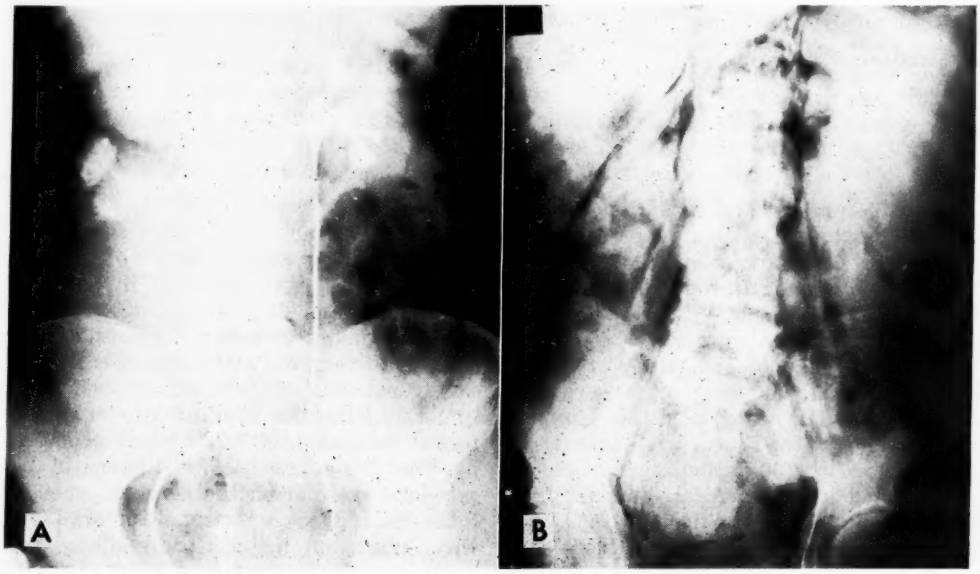


Fig. 5.—*A*, retroperitoneal cyst containing calcified elements. Note displacement of kidney by cyst. *B*, presacral pneumogram. Note large left retroperitoneal mass outlined by air. (This photograph is used by courtesy of Dr. J. Duff of New York, N. Y.)

TABLE 2.—*Pathologic Grouping of Retroperitoneal Tumors in 162 Cases*

Tissue	*No.*	*Benign*	*No.*	*Malignant*	*No.*
Fibromatous tumors	12	Fibroma	1	Fibrosarcoma	11
Adipose	20	Lipoma	6	Liposarcoma	14
Muscle	18	Leiomyoma	2	Leiomyosarcoma	15
		Rhabdomyoma		Rhabdomyosarcoma	1
Vascular	1	Hemangioma			
				Hemangiopericytoma	1
Mesenchymal	3			Mesenchymoma	3
Lymph tissues	48			Reticulum cell sarcoma	41
				Hodgkin's disease	6
				Leukemic infiltration	1
Mesothelial	2	Mesothelioma	2		
Nerve cell tumors	18	Neurilemoma	2	Malignant schwannoma	1
		Ganglioneuroma	3	Partially differentiated ganglioneuroma	2
				Sympathicoblastoma	8
				Chordoma	2
Chromaffin tissue	9	Benign	6	Malignant	3
Rests	15			Teratoma	5
		Cysts	10		
Carcinoma	10			Carcinoma	10
Xanthomatous lesions	4				
Hematoma	2				
Total	162	Total	32	Total	124

sues. In the present series, the retroperitoneal lipomatous neoplasms were second in frequency only to similarly located tumors of the lymphoma group. There were 20 cases, 12 of the patients were female and the remaining 8 were male. In Pack and Tabah's series of 120 retroperitoneal tumors[10] the rhabdomyosarcomas were the largest group (22 cases) and the lipomas came second with 17 cases. Farbman[15] noted that, of the 30 patients whose cases are reported in the medical journals, the youngest was 2 years old and the oldest 86, the greatest incidence being from the fourth to the sixth decades (55.8 per cent). Newman and Pick[2d] recorded an incidence of 50 per cent in the same decades.

The youngest patient in the present series was 2 months old and the oldest 82 years. The greatest number of tumors, 12, or 66 per cent, occurred in patients between 41 and 61 years of age.

Fatty tumors arising in the renal capsule tend to expand and then appear to be extrarenal.[16] Many authors include such tumors under the heading of retroperitoneal neoplasm. Of 132 cases reported by Von Walhendorf,[17] the tumors in 23 per cent arose from the renal capsule. I have excluded such perirenal tumors from this series and included only those that arose outside the capsule, i. e., true retroperitoneal tumors or pararenal lipomas and liposarcomas.

The majority of these neoplasms (about 80 per cent, according to Mayo and Dixon[18]) develop in that part of the potential retroperitoneal space which extends from the region of the lower pole of the kidney to the pelvic brim. The rest arise in the pelvis, usually behind the rectum or the lower part of the sigmoid, and in the iliac fossa.[15]

Neoplasms composed of lipoblasts grow slowly but steadily and can attain a tremendous size without producing any significant discomfort. The adjustment of abdominal viscera to the slow encroachment is amazing. The now famous case of Delamater,[19] reviewed by Stout[14] (Fig. 3), is memorable for the largest tumor of this type to be recorded. The mammoth fatty tumor weighed about 275 pounds (120.2 Kg.). It filled the retroperitoneum and extended through the pelvis to form a perineal tumor 4 feet (1.2 M.) in diameter. The circumference of the abdomen was 7 feet and 8 inches or 2.34 M. (Fig. 3). A retroperitoneal lipoma weighing 69 pounds (31 Kg.) was removed by Hirsch and Wells.[20] Cases have been reported in which the tumor pushed one kidney across the abdomen beyond the opposite kidney. Some patients suffer from generalized lipomatosis, and in some the retroperitoneal lipomatous masses accompany a replacement lipomatosis of the kidney.[21] Other patients show progressive cachexia. It is indeed curious and puzzling that pronounced cachexia can develop in the presence of an enormous localized accumulation of fat—starvation in the midst of internal plenty.[21d]

Many of the tumors are pure lipomas, some are fibrolipomas, and some contain a myxomatous component. Hemolipomatous tumors have been reported.[22] In Von Walhendorf's series[17] 46 per cent were pure lipomas, 54 per cent were mixed. Stout[14] classified liposarcomas as follows: (1) well-differentiated myxoid type; (2) poorly differentiated type; (3) round cell or adenoid type, and (4) mixed group composed of 2 or more elements of the preceding group.

The statistics on the incidence of malignancy in lipomatous tumors vary. Some authors consider this lesion quite rare. Of 132 cases of fatty retroperitoneal tumors in Von Wahlendorf's series[17] 14 per cent were malignant. Farbman[15] noted a 47 per cent incidence of malignancy. Only 5 of the tumors in this series were histologically benign, while 13 or 72 per cent, showed malignant change. In several cases in which the tumors were histologically benign they appeared to be infiltrating and tended to recur.

Tumors of fat tissue origin may be single or multiple. The cut surface is usually white or light yellow. The tumor is soft and doughy, and some of the large ones are deliquescent. Localized areas of softening appear oily; myxomatous areas may feel slimy. The liposarcomas tend to be locally infiltrative and show a great tendency to recurrence. A diffuse metastatic spread is rare. The microscopic picture is variable, ranging from fairly well differentiated adult adipose tissue cells to pronounced anaplasia. Immature and giant lipoblasts with varying degrees of vacuolation or of lipoid droplet formation are fairly common. Stout[14] urged the removal of surrounding tissue during the enucleation of a lipomatous growth in order to avoid recurrence. Pack and Tabah[10] noted that recurrences can appear up to five or six years after removal.

Lipomas: There were 6 cases of lipoma, with 3 male and 3 female patients, aged respectively 2 months and 25, 41, 45, 47 and 67 years.

In the 2-month-old girl baby a large left-sided retroperitoneal lipoma produced a bulging abdomen and dilated superficial veins. The tumor was adherent to the stomach, the abdominal portion of the aorta and the inferior vena cava. Campbell[23] reported a similar case, in which a subrenal retroperitoneal lipoma occurred in a 26-month-old girl whose only symptom was a mass. The tumor was attached to the spine, to the kidney above and to the crest of the ileum below. The second case was that of a 25-year-old man who was

TABLE 3.—*Fibrosarcoma*

Case	*Patient Sex Age*	*History*	*Signs*	*Operation*	*Pathologic Data*	*Comment*
1.	K. D. M 22	Pain in hips, right knee 3 weeks; weakness, distended abdomen, dilated veins	Destruction of 10th, 11th, 12th dorsal and 1st lumbar vertebrae	None		Death 1 month after admission; autopsy; round mass in subdiaphragmatic and retroperitoneal region; fibrosarcoma of retroperitoneum with matastases to liver, pancreas, spleen, lungs, heart, perirenal fat, vertebrae and ribs
2.	C. J. M 44	Hematuria 5 weeks; tenderness left flank	Retrograde pyelogram, right renal pelvis distorted; ureter displaced mesially	Excision of retroperitoneal tumor invading kidney	Fibrosarcoma 540 Gm.	No recurrence after 10 years
3.	F. P. F 45	Upper abdominal mass; vague epigastric discomfort	Right kidney displaced downward by mass	Excision of two masses in right suprarenal region	Fibrosarcoma, 8×4×3 cm.	No follow-up
4.	H. C. M 47	Mass in scrotum & abdomen; weakness several months	Cystogram, extravesical mass	Excision of scrotal mass 740 Gm., recurrence of large retroperitoneal mass explored biopsy performed	Fibrosarcoma invading scrotum, retroperitoneal region; fibrosarcoma retroperitoneal region invading blood vessels	Death
5.	E. S. F 40	Pain in left flank; frequency and abdominal mass 1 year	Large mass in LUQ obscuring left renal shadow	Large mass filling entire left posterior wall, overlying aorta and ilium; biopsy	Infiltrating fibrosarcoma	Transferred for terminal care
6.	A. C. F 52	Loss of strength, swelling of abdomen 1 year; pain LUQ 1 month; huge mass in left half of abdomen	Transverse colon pushed down into pelvis by mass	Large retroperitoneal tumor of varying sized masses between colon and stomach	Fibrosarcoma	Death 24 hours after operation
7.	J. D. M 60	Pain LLQ 4 months; mass removed from same area on two previous occasions; jaundice 1 week	G. I. Series and barium enema negative; no obstruction	Laparotomy elsewhere: inoperable, mass; biopsy only	Fibrosarcoma, recurrent	Death; retroperitoneal fibrosarcoma with metastases to liver; cholemia
8.	E. S. F 46	Pain in left flank 11 months; nausea	Descending colon displaced mesially; IVP "negative"	Rubbery lobulated mass filling left flank to brim of pelvis; biopsy	Fibrosarcoma	Radiotherapy instituted; cordotomy advised

9.	J. M. M 46	History of ulcerative colitis; Ileostomy and cecostomy sixteen years later; abdominal mass; edema of extremities	G. I. series; no intrinsic carcinoma	Huge retroperitoneal mass surrounding rectum, filling flanks and hepatic glands; biopsy; (?) carcinoma	Carcinoma of sigmoid (?)	Death; autopsy, anaplastic sarcoma (?fibrosarcoma) of retroperitoneum with extension to retroperitoneal lymph nodes; compression of aorta
10.	W. J. K. M 5	Upper abdominal mass 1 month	Soft tissue shadows in left side of abdomen	Tumor in epigastrium, 20×10×10 cm., arising from retroperitoneum; biopsy	Fibrosarcoma	Terminal care; radiotherapy
11.	E. L. M 40	Abdominal and rectal pain 8 months	Rectum displaced forward; left ureter displaced medially	Mass from pelvis to umbilicus, left ureter surrounded; left ureter transplanted; biopsy	Sarcoma	Death; autopsy, anaplastic sarcoma (?fibrosarcoma) of retroperitoneum with metastases to liver, pleura, periureteral region; also squamous cell carcinoma of prostate

TABLE 4.—*Lipoma*

Case	*Patient Sex Age*	*Symptoms*	*Observations*	*Operation*	*Pathologic Diagnosis and Results*
1.	G. O. F 2 Mo.	Large abdomen; dilated superficial abdominal veins	IVP; normal pyelograms; dye retained on left side for 24 hours	Exploratory: large retroperitoneal mass adherent to surrounding organs; biopsy	Lipoma
2.	L. P. M 25	Pain in left flank; 6 yrs. ago, left ureter transplant	Bilateral hydronephrosis	No operation	Death in uremia; incidental observation of lipoma along course of left ureter at autopsy
3.	H. R. M 41	Hypertension; mass in RLQ	IVP, mass below and medial to lower pole of right kidney	Exploratory: spherical mass overlying psoas	Lipoma 25 years; uneventful recovery
4.	J. W. M 47	Pulsating mass at umbilicus	G.I. series, negative results	Exploratory: huge mass in retroperitoneum (behind stomach); biopsy	Lipoma, G.I. series four years later "negative"; 6 years later, no recurrence
5.	E. S. F 67	Mass in LLQ observed during routine examination, 1 month	Barium enema, rectum displaced forward	Exploratory: mass below lower pole of left kidney, involving lateral retroperitoneal and extending over into iliac fossa; excision	Lipoma, 20×14×17 cm.; patient symtom free three years later
6.	F. P. F 45	Upper abdominal mass; vague epigastric discomfort	Right kidney displaced downward by mass	Excision of two masses in right suprarenal region	Lipoma of retroperitoneal region; Fibrosarcoma also present; no follow-up

UNIVERSITY OF MICHIGAN LIBRARIES

TABLE 5.—*Liposarcoma*

Case	*Patient Sex Age*	*Symptoms*	*Observations*	*Operation*	*Pathologic Diagnosis and Results*
1.	M. L. M 51	Epigastric distress, 3 mo.; pain on inspiration radiating to left supraclavicular region	Barium enema: mass in LUQ; duodenum displaced to right; left kidney displaced downward	Exploratory: huge retroperitoneal mass; biopsy	Liposarcoma; Terminal care
2.	A. T. F 53	Nausea; vomiting; pain and mass in RUQ	Barium enema "negative" but question of mass in RUQ	Laparotomy elsewhere; inoperable retroperitoneal mass; biopsy	Liposarcoma of retroperitoneum with extension to abdominal scar; death 4 mo. after 1st operation
3.	L. S. M 82	Painless mass in LLQ 5 months	Barium enema: barium arrested at distal end of transverse colon	Laparotomy and removal of large retroperitoneal mass weighing 110 Gm.	Nine years after operation patient celebrated 91st birthday; no recurrence
4.	M. G. F 57	Chills, fever, sweating, dull ache in RUQ 18 mo.; 2 yr. earlier, rt. kidney and ureter removed for stricture	IVP: left kidney hypertrophied	Exploratory: mass in region of rt. adrenal; excision, biopsy	Liposarcoma 950 Gm., 19×14×11 cm.; no follow-up (Fig. 6)
5.	M. H. F 61	Mass in right flank; dull ache	Kidney displaced upward; ureter displaced medially (Fig. 7)	Biopsy	Liposarcoma, 315 Gm., 11×12×6 cm.; no recurrence 9 years
6.	A. A. F 42	Pain and tenderness in LUQ	IVP: mass contiguous with kidney	Operation; large bluish mass in left flank; excision	Retroperitoneal liposarcoma invading kidney; 400 Gm.
7.	J. S. M 53	Mass in left flank	Left kidney displaced upward by mass	Excision of mass in left flank	Liposarcoma, 9 lbs. 28×18×12 cm.; no recurrence 9 years
8.	B. J. F 47	Enlarged abdomen 12 mo.; pelvic mass	Pressure against cecum; rt. kidney displaced upward; IVP, no deformity; G. I. series and B. E., "negative" (Fig. 8)	Laparotomy and removal of large retroperitoneal liposarcoma and hysterectomy	Liposarcoma, partly myxoid; terminal

9.	G. M. F 61	Lump in groin in RLQ 7 wks.; 1st operation, retroperitoneal liposarcoma excised; patient readmitted one year later with abdominal distention, vomiting, jaundice	G. I. series and gall bladder studies "negative"	1st operation, 1945; recurrence, 1946; large retroperitoneal tumor; roentgen treatment	Autopsy; liposarcoma invading duodenum, common duct, mesentery
10.	E. K. M 28	Two years earlier, fibrolipoma of retroperitoneum excised; recurrence of six months' duration; painless mass	IVP, no excretion left side; left hydroureter and hydronephrosis	Exploratory: large retroperitoneal mass extending to pelvis; aorta pushed to right; attached to spine; inoperable; biopsy	Liposarcoma; terminal
11.	A. L. F 45	Pain and mass in LLQ	IVP, poor excretion from left kidney; barium enema, descending colon displaced laterally	Excision of left kidney with tumor attached to lower pole	Liposarcoma 870 Gm.; death 88 days after operation; no autopsy; local recurrence; hemorrhage, G. I. tract
12.	S. McI. F 57	Steadily enlarging abdomen, 11 yrs.; loss of weight; weakness; constipation; right foot swollen	Large abdominal mass in right flank	Inoperable; biopsy	Tumor of fatty tissue; death: autopsy, lipomyxofibrosarcoma of retroperitoneum, thrombosis of common iliac artery
13.	W. L. M 65	Abdominal mass 1 mo.	Soft mass in RUQ	Inoperable tumor invading liver	Liposarcoma
14.	I. S. F 67	Operated on elsewhere and a 16 lb. lipomyxosarcoma removed from lower retroperitoneum; recurrence; edema of extremity and back	IVP; left kidney displaced laterally by large mass; splenic flexure and descending colon displaced ventrad and caudad	Inoperable; thigh amputated at midportion (left) due to left femoral involvement	Diarrhea; cachexia; death 14 mo. after first operation

Fig. 6.—Liposarcoma of retroperitoneum weighing 950 Gm. from a woman aged 57 (Case 4).

brought to the hospital because of pain in the left flank and uremia. The lipoma was a postmortem observation. Another man, 41 years of age, had a mass measuring 1 by 6 cm. to the right of the aorta. There was a suspicion of paraganglioma, but the tumor turned out to be a lipoma. Another patient, a 47-year-old man, presented a large, pulsating mass at the umbilical area. It proved to be a histologically benign fatty tumor, but was very extensive, so that complete removal was not possible. The fifth case was that of a 67-year-old woman in whom a mass occupying the left lower quadrant was observed. A barium enema revealed anterior displacement of the sigmoid. Exploratory operation showed a large lipomatous tumor extending from the lower pole of the left kidney along the lumbar gutter to the iliac fossa. It is not unlikely, judging from the operative picture, that the growth in 1 or 2 of these cases may have been a liposarcoma, and that the biopsy specimen happened to come from a well-differentiated, benign-looking area in an otherwise malignant tumor.

Liposarcomas: Summaries of some of the cases are here presented. In Case 1 a 51-year-old man was admitted to the hospital, because of epigastric distress, and pain on inspiration of only three months' duration. The left side of the diaphragm was raised, a barium enema revealed a forward displacement of the splenic flexure. The patient had a huge liposarcoma that extended from the level of the transverse colon to the rectum. Only a biopsy specimen could be obtained, and it revealed liposarcoma. The outlook in this case was ominous. On the other hand, another patient, an 82-year-old man (Case 5) came with a history of a mass in the left lower abdominal quadrant of five months' duration and progressive constipation. This was a liposarcoma that occupied the left lower retroperitoneal area and weighed 1,701 Gm. When last seen, at the age of 91, the patient was free of recurrence.

Case 6 was that of a 42-year-old woman with a left-sided 400-Gm. retroperitoneal liposarcoma that had invaded the kidney. A retroperitoneal liposarcoma weighing 315 Gm. was removed from a woman 61 years of age (Case 5, Fig. 7) whose only symptom was "abdominal mass." There has been no recurrence in this patient for over nine years. A 53-year-old man (Case 7), had a left-sided, painless retroperitoneal mass, discovered during examination for symptoms caused by an enlarged

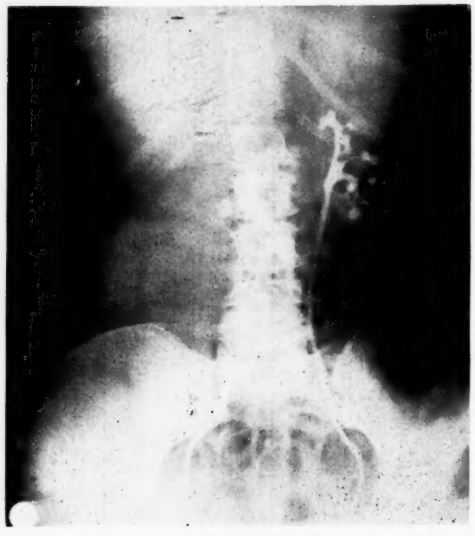


Fig. 7.—Retrograde pyelogram showing liposarcoma of retroperitoneum from a woman aged 61 (Case 5). Retrograde pyelogram. Note displacement of right kidney pelvis and ureter by mass.

prostate. There was no evidence of renal or intestinal compression. The mass was well encapsulated, weighed 9 pounds (4.1 Kg.), measured 28 by 18 by 13 cm. and was easily excised. The liposarcoma has not recurred for a period of nine years. Another patient, a 47-year-old woman (Case 8, Fig. 8*A*) had noted an enlarging abdomen for a period of one year. Urologic study revealed an upward displacement of the ureter. The calyceal system was uninvolved. The barium enema studies showed impingement by an external mass on the cecum. An 11-pound (5-Kg.) retroperitoneal liposarcoma was removed, and there has been no recurrence for thirteen years.

Another patient, a woman 61 years of age (Case 9) had undergone three laparotomies for removal of recurrent liposarcoma. After the last operation she had received roentgen treatment. Progressive abdominal enlargement, nausea, vomiting, jaundice and clay-colored stools preceded death. Autopsy revealed a large retroperitoneal liposarcoma (Fig. 7) extending into the mesentery, invading loops of small intestine, the duodenum and the common bile ducts. Case 10 was that of a 28-year-old man in whom a large tumor occupied the lower right portion of the retroperitoneum and was discovered during operation for acute appendicitis. Only a biopsy specimen was obtained, and the pathologist's diagnosis was fibrolipoma. The mass increased in size, and two and a half years later another exploratory operation showed it to be fixed to the spine and the inferior vena cava. It was stony hard and not resectable. A preoperative intravenous pyelogram showed no excretion of the dye by the right kidney. At operation it was noted that the extensive liposarcoma had also invaded the right psoas muscle and the right ureter.

Muscle Tumors.—The tumors in the 18 cases in this group included 2 leiomyomas, 15 leiomyosarcomas, and 1 rhabdomysarcoma (rhabdomyoma was not encountered). There were 8 male and 10 female patients, whose respective ages (in years) were 1, 1½, 28, 32, 34, 40, 45, 48 (2 patients), 49, 52 (3 patients), 60, 63, 64 and 69.

Retroperitoneal *leiomyomas* are relatively rare. They are said to airse from the musculature of large arteries or veins. They are usually labeled fibromyomas. Stout[9] mentioned Kraner's patient, a 28-year-old woman with a retroperitoneal fibromyoma as large as a child's head, and Forini's, a 50-year-old man with a pararenal tumor that weighed 4200 gms. Pack and Tabah[10] stated that only 12 cases have been reported. They added 2 cases. There were 2 cases in this series. One was that of a 28-year-old woman who came to the hospital with mild backache and in whom a right abdominal painless mass weighing 625 Gm. was observed. It proved to be a leiomyoma (Fig. 10). The intravenous pyelogram had shown a forward and upward displacement of the kidney and ureter by a retroperitoneal mass but no disturbance of function and no distortion of calyceal pattern. The patient had been free of recurrence or metastases for five years.

The second case was that of a 45-year-old woman who complained of recurrent abdominal pain of two days' duration and of ribbon-like stools. A very large mass was palpable in the left flank. At operation a serosanguinous fluid was present in the peritoneal cavity, and a huge, irregularly shaped mass filled the left side of the pelvis and extended upward to the level of the kidney. An entero-enterostomy was performed for partial ileus and a biopsy specimen obtained. A well-differentiated, partially fibrosed and calcified leiomyoma was observed. The possibility that this was a "metastasizing leiomyoma" was noted in the pathologic report. The patient died thirty days later, but an autopsy was not performed.

Leiomyosarcomas are somewhat more Stone[24] reported a tumor weighing about 350 Gm. that pushed the left kidney mesially, compressing the ureter and causing procommon than benign tumors. Morgan and nounced hydroureter and hydronephrosis.

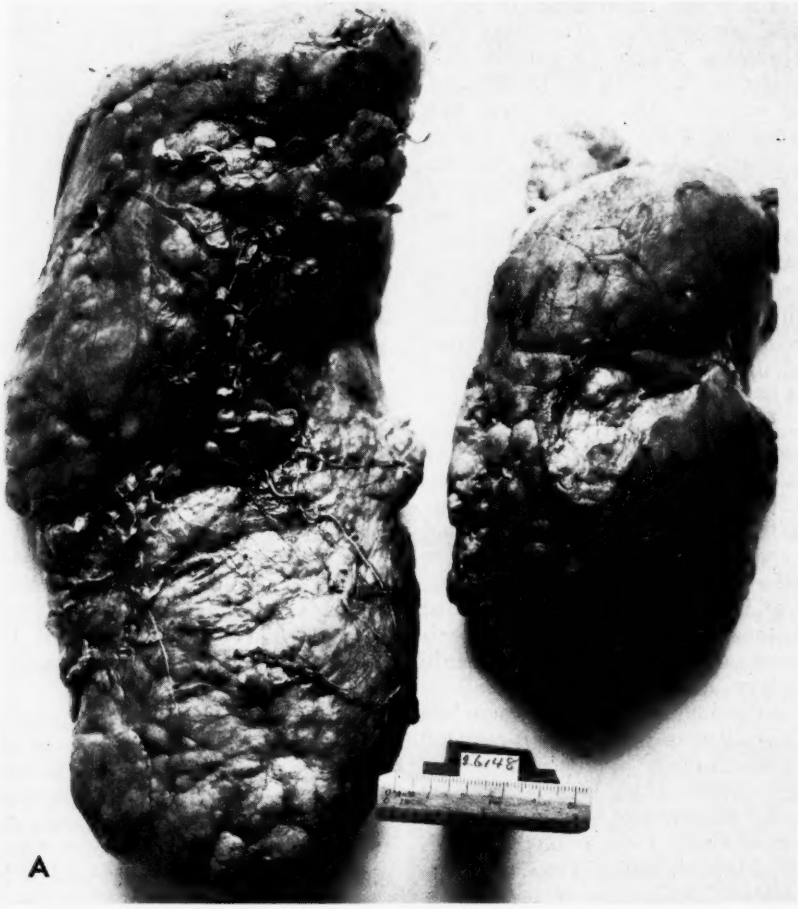


Fig. 8A.—Lipomyxosarcoma of retroperitoneum from a woman aged 47 (Case 8).

Pack and Tabah[10] reported 5 cases. They stated that these malignant growths may metastasize via blood vessels to the liver and lungs, but are less malignant than the rhabdomyosarcomas. There were 15 cases in this series, with 7 male and 8 female patients, and the age range was from 13 months to 69 years, the average age being 43 years. The tumor in 1 of our cases (Case 13, Fig. 11) resembled that described by Willis.[13] In each a hugh retroperitoneal leiomyosarcoma was present, as well as numerous satellite growths in the mesentery.

Rhabdomyomatous Tumors: There was only 1 case of a striated muscle tumor in the series. The sections of the partly excised mass were suggestive of a rhabdomyoma. The gross appearance and clinical course, however, were characteristic of a markedly malignant growth. The patient, a 1-year-old girl, was first seen when she was 4 months old, because of a protuberant abdomen (Fig. 12A). She was treated by radiotherapy, but the abdomen continued to expand and numerous dilated veins appeared. The right kidney failed to excrete dye, and the colon was displaced to the

left. At operation a hard mass was observed in the right flank. It was smooth, glistening gray and firmly adherent to the posterior abdominal wall. A piece measuring 14 by 8 by 4 cm. was excised. On section, the specimen taken for biopsy revealed a well differentiated rhabdomyoma (Fig. 12*B*), but the patient continued a downhill course and died two months after the operation.

Hemangiopericytoma. — Hemangiopericytoma is a tumor composed of proliferating capillaries and pericytes[25] (which according to Zimmerman, are variants of smooth muscle cells but are without myofibrils). In 1942, Stout and Murray[26] described a tumor composed of pericytes and capillaries, and up to 1950 Stout, with the cooperation of other pathologists, identified 34 hemangiopericytomas. The tumors occurred from birth to the eighty-first year and affected the two sexes equally. They were firm, nodular and occasionally calicfied. The neoplasm tends to metastasize via the bloodstream. Other vascular tumors of the retroperitoneum have been reported. Marragini[27] described a pararenal angiosarcoma in 1949, and Ward and Stewart[28] reported a retroperitoneal cavernous hemangioma in 1950. The case included in the present series was that of an 11-year-old girl from whom a firm, nodular, vascular retroperitoneal mass was removed. The microscopic sections revealed hemangiopericytoma. The tumor recurred and metastasized to the skull, femur and pelvis.

Mesenchymoma.—Three cases of mesenchymoma were encountered. One patient was male and 2 were female.

In 1943 Gilmour[29] reported a recurrent subcutaneous tumor on the back of a 23-year-old woman. The tumor was composed of mucous connective tissue containing neoplastic capillaries, lipoblasts, primitive erythroblasts and erythocytes, lymphocytoid wandering and a few nucleated blood cells in addition to erythroblasts. He suggested the term mesenchymoma on the assumption that the mixture of neoplastic elements were derivatives of primitive mesenchyme. Stout[30] urged the use of this term in order to avoid the awkward multicompounded names which have appeared in some case reports.[31] These tumors are actually or potentially malignant. Bowen[32]

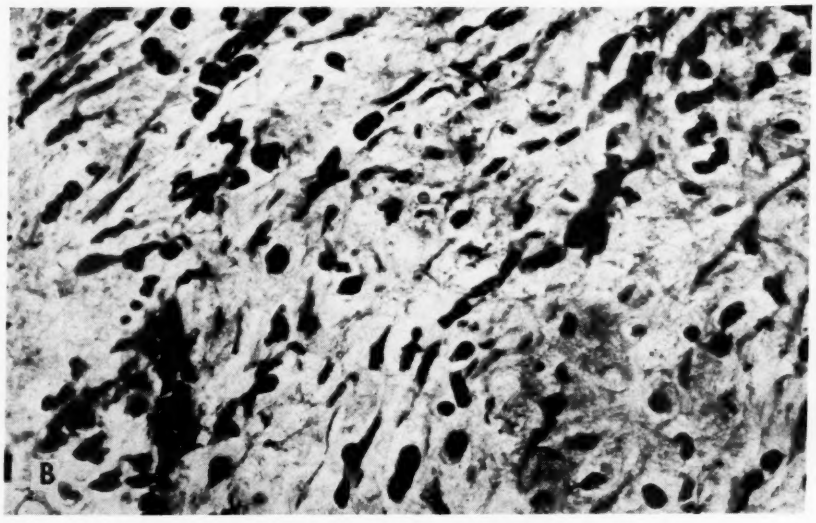


Fig. 8*B*.—Myxomatous element in liposarcoma (Case 8).

reported a mesenchymoma primary in the pelvic retroperitoneal space which had invaded the bladder wall. Three of the cases in this series may be included under the heading of mesenchymoma (Table 7).

The Lymphomas (48 Cases). — There were 41 lymphosarcomas, 6 cases of Hodgkin's disease and 1 case of leukemic infiltration. Of the 41 patients with lymphosarcoma, 23 were male and 18 female. The age distribution was as follows: 0 = 9 years, 2; 10 = 19, 0; 20 = 29, 0; 30 = 39, 7; 40 = 49, 7; 50 = 59, 13; 60 = 69, 7; 70 = 79, 5; 80 = 89, 0.

The lymphomas, according to Willis,[13] tend to occur most frequently in the cervical, *abdominal* and mediastinal lymph glands. At times scattered groups of lymph glands are involved, and the question then arises whether the disease is multicentric, or whether it is unicentric with metastases.[33] It is Willis' opinion that both processes can occur. Craver[34] has expressed the opinion that 'the lymphomas' tend to be unicentric in origin in the *early stage* and therefore possibly curable if diagnosed early and treated so as to remove or sterilize all of the disease while it remains confined to the early focus. Hidden in the retroperitoneum, lymph glands involved by this disease slowly enlarge, become confluent and silently displace the yielding overlying viscera. Unfortunately, therefore, symptoms develop late in the disease. Thus, the duration of symptoms on arrival at the hospital in most cases (31 out of 40), was less than one year. Yet the majority of the tumors were by that time markedly enlarged, multiple and inoperable.

The commonest symptoms were abdominal enlargement (swelling or mass), pain, intestinal upsets, constipation, and nausea and/or vomiting. The pain was described as abdominal discomfort or epigastric distress, or as a backache or flank pain. At times it was referred to the umbilical region, and at other times it re-

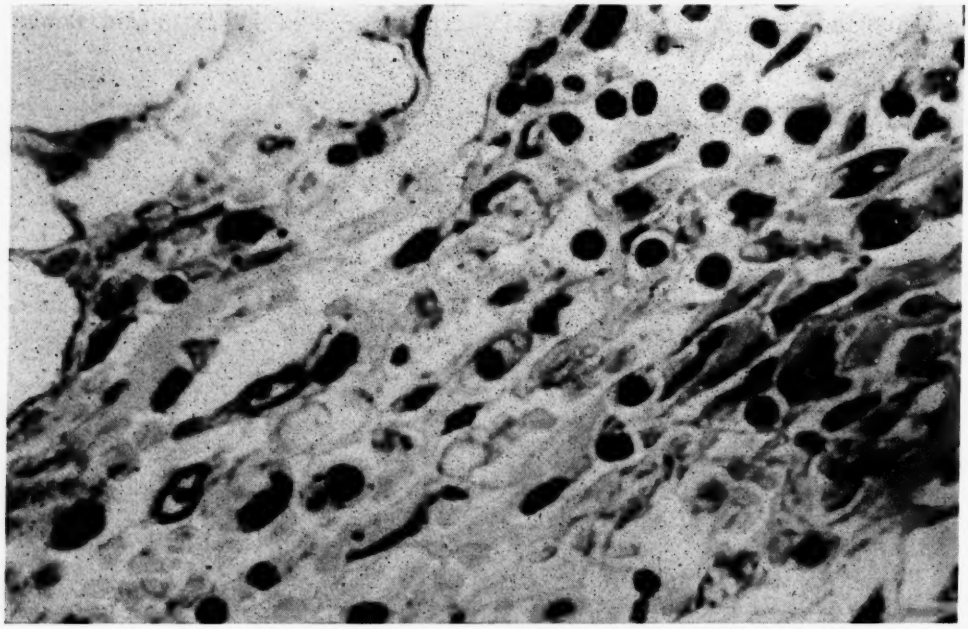


Fig. 9.—Liposarcoma of retroperitoneum.

sembled intestinal colic. There were some patients in whom the pain was pleuritic, and others who complained of "sciatica" with pain radiating down one or both extremities. Other symptoms, in order of frequency, were fever, weakness, loss of weight, anorexia, dilated abdominal veins, dyspnea, ascites, frequency of urination, dysuria, edema of one or both lower extremities, hematuria, fluid in the chest, acute retention and hemoptysis.

The duration of symptoms was as follows: to one month, 12 cases; to six months, 20 cases; to one year, 4 cases; to two years, 5 cases; duration not mentioned, 4 cases.

The primary tumor sites were given as follows: In retroperitoneal tissue, retroperitoneal lymph glands or mesenteric lymph glands, 36; "behind" the duodenum and pancreas, 3; and "posterior" to the stomach, 2 and presacral, 1.

Invasion of neighboring organs from retroperitoneal lymphosarcoma happened often. Those involved, in order of frequency, were as follows: kidney(s), pancreas, diaphragm, stomach and small intestines, duodenum, adrenal gland, urinary bladder, colon and rectum, dura mater, peritoneum and prostate (Figs. 14 and 15).

Some patients with retroperitoneal malignant lymphoma showed a similar process in lymph glands of other regions of the body. The impression was that in some instances these were metastatic lesions or possibly manifestations of a multicentric process. There was also the possibility that in a few of the cases the retroperitoneal site was secondary. The following organs and tissues were listed as the seats of metastasis from malignant lymphoma of the retroperitoneum: 1. lymph glands (mediastinal, bronchial, cervical, axillary, iliac, inguinal, and pelvic). 2. Organs and tissues (in order of frequency), spleen, lungs, liver, adrenal, kidney, and urinary bladder. The heart, stomach, thyroid, sternum, uterus and ovaries were involved less frequently. The tumor masses at times compressed the aorta, and when the ureter

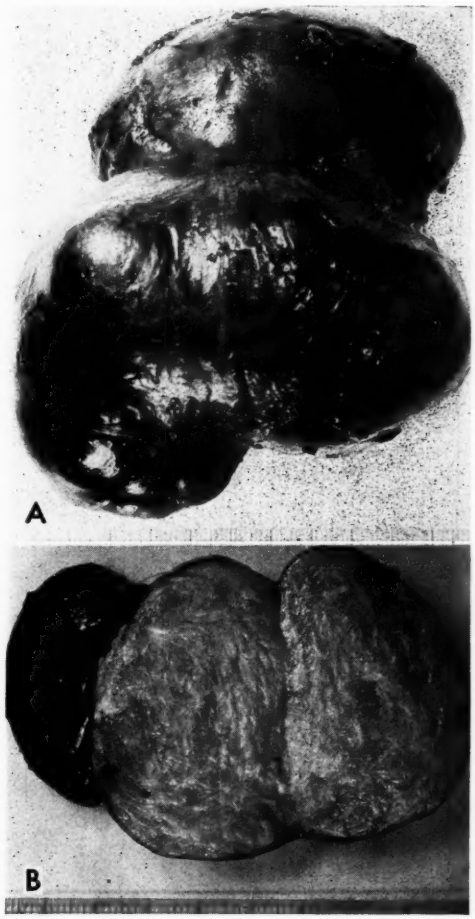


Fig. 10. — *A*, leiomyoma of retroperitoneum weighing 625 Gm. from a 38-year-old woman. Specimen consists of kidney and tumor. *B*, tumor cut in half.

was encountered and compressed hydronephrosis resulted.

The patient with chronic lymphatic leukemia (M. G. aged 51) was admitted to the hospital because of flank pain, weakness and ascites. Tapping of the abdomen followed by radiotherapy and cortisone were tried without success, and the patient died six months after admission. The leukocyte count during radiotherapy ranged from 950 per cubic millimeter, 50 per cent lymphocytes, to 19,900 per cubic milli-

TABLE 6.—*Leiomyosarcoma*

Case	*Patient Sex Age*	*History*	*Observations*	*Operation*	*Pathologic Diagnosis and Results*
1.	L. G. M 1-1/12	Abdominal mass size of football, extending to prostatic region	X-ray, metastases to lungs; left hydroureter and left hydronephrosis	1st operation, partial excision of mass; 2d operation, suprapubic cystostomy for retention	Leiomyosarcoma; death; autopsy, leiomyosarcoma apparently arising in retroperitoneum and extending in all directions; intestine plastered, bladder and diaphragm invaded
2.	R. Z. M 32	Pain LLQ; impotence; weakness in both lower extremities; pain in lumbar area; swelling of feet; frequency; tremor; large mass left flank	Metastases to lumbar portion of spine	Exploratory: lobulated tumor involving left retroperitoneal area attached to psoas muscle; inoperable	Death; autopsy, retroperitoneal leiomyosarcoma invading 1st, 2d, 3d lumbar vertebrae, psoas muscle, and inferior vena cava for a distance of 7 cm.
3.	A. N. F 34	Pain in RLQ; constipation; nausea; vomiting; retroperitoneal mass noted during appendectomy 11 years prior to present admission	Flat film of abdomen essentially normal	Exploratory: inoperable retroperitoneal tumor extending to appendectomy scar; biopsy	Leiomyosarcoma; death 3 months after last operation
4.	L. T. F 40	Dull ache LLQ epigastric, sense of fullness. Small mass in RLQ, fixed to posterior abdominal wall		Exploratory: mass 8 cm. in diameter; biopsy	Leiomyosarcoma; death; no autopsy
5.	A. G. F 48	Retention urine requiring catheterization; dragging sensation in pelvis; vague deep mass in hypogastrium		Exploratory: inoperable mass in retroperitoneum; biopsy	Leiomyosarcoma; death; autopsy, tumor 10 × 15 cm. in hollow of sacrum, pushing rectum forward
6.	S. P. M 49	Abdominal cramps, pain, and mass in RUQ of abdomen	Stomach displaced upward and to left by mass, either cyst or tumor	Excision of retroperitoneal mass adherent to hepatic flexure, transverse to colon and mesocolon	Leiomyosarcoma 20 × 15 cm.; roentgen treatment; ascites; death two years after onset of symptoms
7.	V. P. F 48	Epigastric mass 3 months; nausea, vomiting; jaundice, edema of lower extremities 1 week	Mass filling entire RUQ; renal shadows intact	Exploratory: huge lobulated mass about 20 cm. in diameter, yellowish, friable; biopsy	Death; autopsy, retroperitoneal leiomyosarcoma invading inferior vena cava, iliac and femoral veins; thrombosis of hepatic veins with intense venous congestion of liver (Chiari syndrome)

8.	M. M. F 52	Epigastric mass; mass in RUQ 1 month	IVP, good function mass below and behind kidney. Duodenal loop expanded by mass	Exploratory: large mass behind pancreas 15 cm. in diameter; biopsy	Leiomyosarcoma; death at home
9.	S. M. M 52	Three years ago leiomyosarcoma of ileal region removed; now recurrence in region of scar; tarry stools	Leiomyosarcoma of ileal region	Exploratory: huge, firm, nodular mass extending from pouch of Douglas; inoperable; biopsy	Death elsewhere; autopsy, retroperitoneal leiomyosarcoma with invasion of rectal wall and small intestine
10.	D. Z. M 52	Recurrent epigastric distress and pain 10 years; mass LUQ	Left kidney displaced down by large retroperitoneal mass	Exploratory: mass fills entire retroperitoneal area; inoperable; biopsy	Death; autopsy, retroperitoneal leiomyosarcoma
11.	E. T. F 54	Loss of weight 3 years; pain in flank; mass on right side 1 year	Calcified mass in RUQ	Excision of retroperitoneal mass, and hysterectomy	Leiomyosarcoma; recurrence 3½ years later; death 6½ years after onset of symptoms
12.	J. DeF. F 60	Lump in LUQ, pain in left flank	IVP, no excretion on left side	Exploratory: retroperitoneal mass behind descending colon; kidney displaced forward and downward	Leiomyosarcoma; death at home 2 months after operation
13.	J. S. M 63	Enlarging abdomen; mass above prostate	Both ureters displaced outward by centrally placed mass	1st operation, loop of gut with mass in mesentery excised; retroperitoneal mass palpated (Fig. 11); 2d operation; ascites, innumerable multiple masses in retroperitoneum; some excised	Leiomyosarcoma; death at home 6 months after 2d operation and about 2 years after onset
14.	K. M. F 64	Constipation, anorexia, frequency 2 months	Large mass in lower part of abdomen	Large solid tumor arising out of pelvis; excision	Leiomyosarcoma; recurred in 15 mo.; inoperable
15.	F. R. M 69	Pain in RUQ 3 months	IVP, no excretion on right side. Retrograde pyelogram, obstruction of right ureter with dilatation above	Huge retroperitoneal mass in right flank to liver; biopsy	Leiomyosarcoma; death

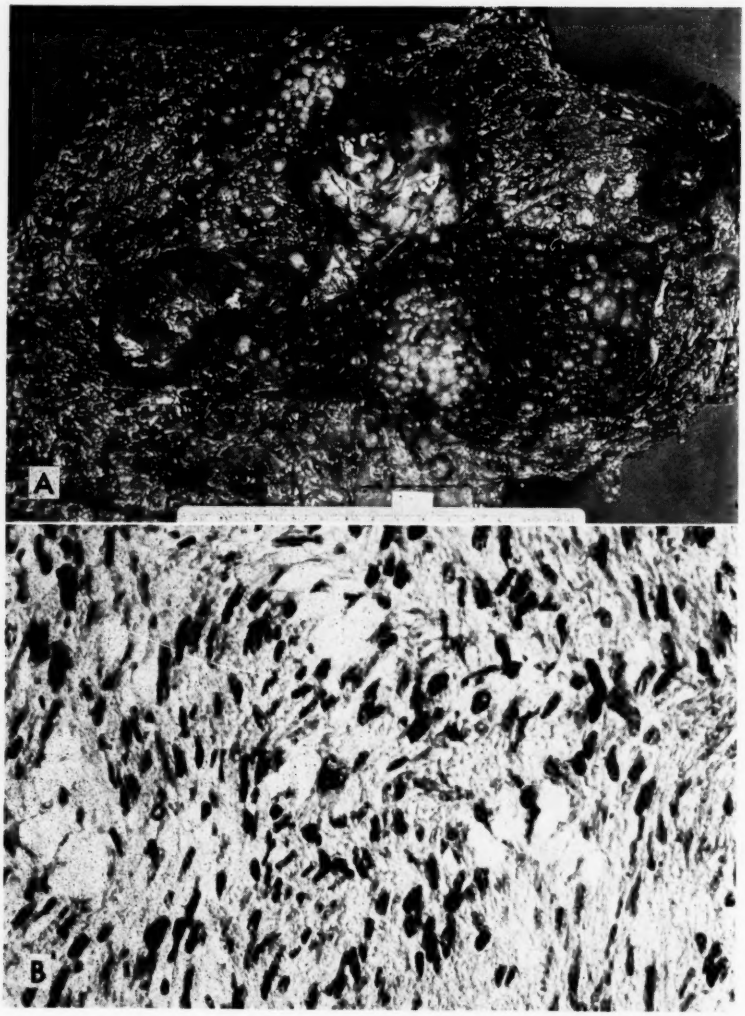


Fig. 11.—*A*, leiomyosarcoma of retroperitoneum from a man aged 63 (Case 13). Multiple masses involved entire retroperitoneum and extended into mesenteries. Ureters displaced. *B*, low power photomicrograph of same specimen.

meter, of which 68 per cent were lymphocytes. At autopsy the retroperitoneum was diffusely infiltrated. The spleen, liver, lungs, kidneys, stomach, bone marrow and testes, as well as most lymph glands, were also involved.

Hodgkin's Disease.—Of the 6 patients with Hodgkin's disease, 5 were men and 1 was a woman. Their respective ages were 34, 48, 51, 56, 65 and 65.

All of the patients died. The symptoms varied: dull to severe pain in the flank or the abdomen, diarrhea, bloody stools, pain in the legs, loss of appetite and weight,

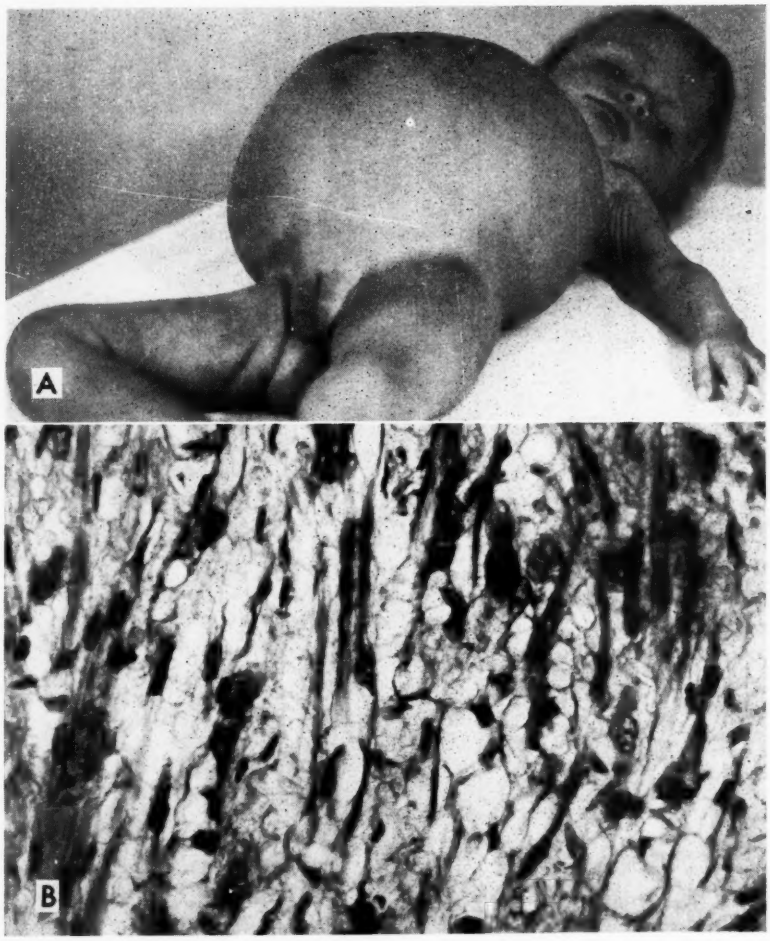


Fig. 12.—Rhabdomyomatous tumor of retroperitoneum. The patient, a 1-year-old girl, had an abdominal mass of eight months' duration. B, microscopic section showing differentiation. Note striations.

fever and ascites. In all patients a vague to definite abdominal mass, usually single and lobulated, was palpable. Diagnosis was usually established by exploratory operative biopsy when a mass or masses were present but inoperable. They often displaced the ureter and kidney and in later stages invaded the latter. The primary locations in the retroperitoneum were: behind the pancreas and below the liver (1 case), behind the rectum in the hollow of the sacrum (1 case and along the flanks (4 cases). There was involvement also of other lymph glands by Hodgkin's disease (cervical and mediastinal, 2 cases) and other organs: pancreas (2 cases), ileum, spleen, heart, adrenal, femur and kidney (3 cases [Fig. 16]).

Mesothelioma.—There were 2 cases of mesothelioma, the patients being a man aged 68 and a woman aged 39.

The lining cells of the celomic cavity,

TABLE 7.—*Mesenchymoma*

Case	*Patient Sex Age*	*Symptoms*	*Observations*	*Operation*	*Pathologic Diagnosis*	*Results*
1.	A. B. F 56	Enlarging abdomen, pain in right thigh, 1 month	Right kidney displaced upward and ureter medialward by mass; right hydropelvis	Multiple retroperitoneal masses excised	Mesenchymoma of retroperitoneum	Returned one year later with mass adherent to aorta and lumbar spine; inoperable; discharged for terminal case
2.	A. S. F 64	Abdominal discomfort 4 mo.; loss of appetite two weeks; irregular large mass in RUQ; constipation	Barium enema; transverse colon displaced downward by mass in RUQ; renal shadow obscured (Fig. 13*B*) Retrograde pyelogram: right kidney displaced and calyces distorted; right ureter displaced to midline	Large retroperitoneal mass excised	Mesenchymoma of retroperitoneum invading kidney	Death; autopsy revealed tumor had invaded adrenal gland, gall bladder and lung
3.	A. R. C. M 70	Loss of weight 2 years; constipation, pain left side 4 months; abdominal mass	G. I. series "negative"; metastasis to lungs	Inoperable; roentgen treatment		Death in ward; mesenchymoma; huge pearly white mass; extension to lateral chest wall and metastases to heart, lungs, bronchial lymph glands, diaphragm, muscles, ribs, vertebrae

TABLE 8.—*Hodgkin's Disease*

Case	*Patient Sex Age*	*History*	*Observations*	*Operation*	*Pathologic Diagnosis and Results*
1.	J. B. M 34	Dull pain left flank 3 months; constipation; fever	Resistance and mass in left flank; left kidney shadow displaced downward	Exploratory celiotomy 10 cm. round tumor behind pancreas and below liver; rubbery; biopsy	Hodgkin's disease of retroperitoneum; radiotherapy, mustard; death four years after 1st admission
2.	H. A. M. F 65	Fever four months; tenderness in left flank; ?mass	G. I. series "negative"; left kidney displaced laterally and upward by retroperitoneal mass; ureter distorted (Fig. 16)	Incision and drainage of retroperitoneal abscess; mass size of lemon below lower pole left kidney; broke easily; thought to be perirenal abscess; biopsy	Hodgkin's disease; X-ray treatment; death 2 months after operation; autopsy, Hodgkin's disease of retroperitoneal lymph nodes; hydronephrosis
3.	E. B. M 51	Abdominal pain; fever; bloody stools	G. I. series, disturbed motor function of small intestine; nonpulsating mass in mid-abdomen; ascites	Exploratory celiotomy; 1,500 cc. straw-colored fluid in abdomen; retroperitoneal mass from brim of pelvis to diaphragm; biopsy	Death due to shock day after operation; autopsy, Hodgkin's disease external to pancreas, ileum; massive gastrointestinal hemorrhage
4.	H. D. M 48	Pain in left leg and buttock; loss of appetite and weight for four months; abdominal enlargement	Mass in abdomen; enlarged cervical lymph nodes	Treated with nitrogen	Death; Hodgkin's disease, retroperitoneal, cervical, and mediastinal lymph nodes and spleen
5.	C. W. M 56	Pain in left hip one year; abdominal masses, cervical lymph gland enlarged		Biopsy	Hodgkin's disease; death; autopsy, Hodgkin's disease, retroperitoneal mass to left abdominal aorta 15×12×7 cm.
6.	W. W. S. M 65	Loss of weight; diarrhea; abdominal pain for 2 years	Mass in center of abdomen		Death in ward; autopsy; Hodgkin's disease of retroperitoneum; retroperitoneal hemorrhage

i. e., the mesothelial cells, gives rise to the peritoneum, pleura, pericardium, etc. Maximov stated that the cells can form not only mesodermal epithelium but smooth muscle as well.[35] Tumors arising from mesothelial linings or mesothelial rests are called mesotheliomas. Stout and Murray in 1942, by means of tissue culture, showed that the site of origin of the cells composing such tumors is the pleura, the peritoneum or the pericardium. Stout has expressed the opinion that, in the fibrous form of mesothelioma, cells assuming the characteristics of fibroblasts can stem from the mesothelium.[11]

Mesotheliomas are composed of epithelioid cells arranged in cords or channels, or pseudo-acini. Smooth muscle or fibrous tissue stroma may be present. Some authors doubt the mesothelial origin of some of these tumors, particularly those occurrying near the epididymis or testis. They then prefer the term lymphangioma or "adenomatoid" tumor for mesothelioma.

The first case was that of a 68-year-old man who was admitted in semicoma of twelve hours' duration. The abdomen was protuberant. Exploratory celiotomy revealed an encapsulated nodular retroperitoneal mass measuring 18 by 15 cm. It

Fig. 13*A*.—Mesenchymoma of retroperitoneum (Case 2) patient, a woman 64 years old.

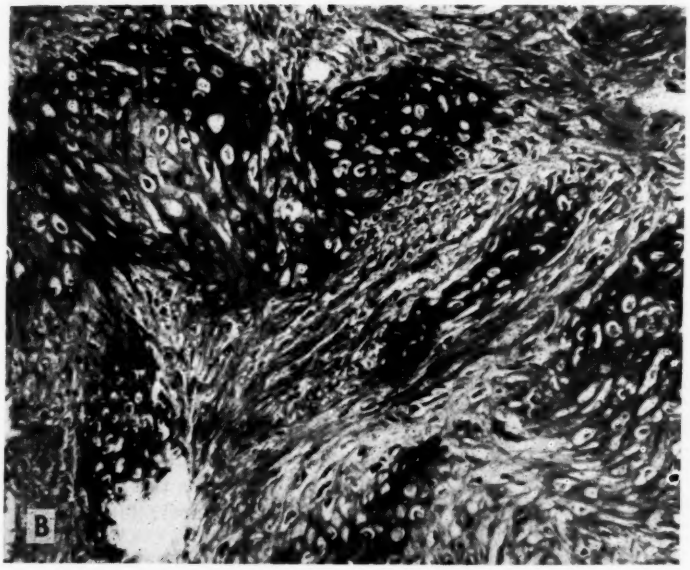


Fig. 13*B*.—High power photomicrograph of mesenchymoma, showing area of cartilage. Other areas showed neoplastic capillaries, primitive erythroblasts, nucleated cells, lipoblasts, etc.

seemed to arise mesial and inferior to the proximal portion of the duodenum but was not connected with either that organ or the pancreas. The microscopic sections revealed a fibrous form of mesothelioma.

The second patient was a 39-year-old woman who complained of vague pain in the left lower quadrant of the abdomen. A mass was palpated in the hypogastrium. This was excised, and a retroperitoneal mesothelioma was revealed. The patient made an uneventful recovery.

Retroperitoneal Nerve Cell Tumors.—These tumors occurred in 18 cases.

Tumors of peripheral and sympathetic nerves may occasionally (though rarely) develop in the retroperitoneum. They are apt to grow to very large size before being discovered. Other tumors that resemble the nerve cell tumors of the adrenal medulla can arise from the sympathetic ganglia.[35] Pack and Tabah[10] stated that about one third arise from the adrenal gland, one third from abdominal and pelvic ganglia and the remainder from other regions of the body. Sympathicoblastomas, partially differentiated ganglioneuromas and ganglioneuromas have been reported. The presacral chordomas, i. e., tumors arising from remnants of the notochord, may also be included under the group of retroperitoneal masses.

Benign Neurilemmoma (benign schwannoma): This relatively benign tumor can occur in peripheral, cranial and sympathetic nerves, and arises from the sheath of Schwann. When small, it is usually solid; when large, it may become cystic because of degeneration. The tumor tends to attain a large size in the retroperitoneum, mainly because of delay in discovery, and von Recklingshausen's disease may be present. There were 2 such tumors in our series. The first occurred in a 51-year-old man who complained of constipation of a year's duration. An abdominal mass was palpated in the hypogastrium. It seemed deep and fixed. A tumor measuring 22 cm. in diameter was removed, and the microscopic sections showed a rela-

Fig. 14.—Retrograde pyelogram showing lymphosarcoma of left retroperitoneum. Note medial displacement of ureter. The kidney has been diffusely infiltrated, which has resulted in enlargement of the organ and elongation and dilatation of the calyces.

tively benign neurilemmoma. The second neurilemmoma occurred in a 54-year-old man and was excised from an area near the tail of the pancreas. It was thought to be a pancreatic cyst. The patient has had no recurrence over a two year follow-up period.

Malignant Neurilemmoma (malignant schwannoma) : This tumor arises from the Schwann cells and is usually symptomless unless a large nerve is involved. It expands steadily and metastasizes usually via the bloodstream. The component cells, like those of a benign neurilemmoma, grow in cords, with nuclei in tandem formation and tending to palisade. Reticulin fibers run parallel to the long axes of the cells. There was 1 case in the present series; that of a 43-year-old man with an inoperable mass in the left flank. Biopsy and autopsy revealed a malignant schwannoma of the retroperitoneum with extension into the intestinal tract.

Sympathicoblastoma: This highly malignant tumor is composed of immature sympathetic ganglion cells and occurs mainly in children up to the fourth and fifth years of age. It tends to metastasize early, particularly to the skull and/or liver or lymph glands. There were 8 cases in this series; 6 of the patients were boys and 2 were girls, and their ages were 2 months, 16 months, 21 months, 2 years (2 cases), 29 months, 3 years, and 4 years respectively. All presented abdominal swelling, and in all cases the tumors were retroperitoneal. Several showed metastases to the skull (Hutchison's syndrome) and in others the liver was involved (Pepper syndrome).

Fig. 15.—Lymphosarcoma retroperitoneum. Note enlarged glands, displaced left ureter and dilated left renal pelvis.

Partially Differentiated Ganglioneuroma (malignant ganglioneuroma) : This tumor is said to be less malignant than sympathicoblastoma. Cells showing some ganglion-like differentiation are present. One of the patients in this series, a 66-year-old woman, was admitted to the hospital with a history of constipation of one year's duration and of an abdominal mass of which she had been aware for three months. A large retroperitoneal cyst and a lobulated mass were removed. The latter proved to be a partly differentiated ganglioneuroma. The patient returned one month later with loss of weight, constipation, weakness, and inoperable recurrent tumor (Fig. 17).

Ganglioneuroma: This tumor is composed of fully differentiated sympathetic ganglion cells and numerous sheathed nerve fibers running in every direction. It may develop anywhere along the chain of sympathetic ganglia. It is well encapsulated, but its situation may make it impossible to eradicate by surgical measures.

Chordoma: The usual source of chordoma is from aberrant residual notochordal tissue at the two extremities of the axis; and, very rarely, from the normal intervertebral discs (Willis). The tumors are lobulated, gelatinous, partly hemorrhagic or calcified, and consist of irregular groups of prominently polyhedral vaculoated cells with many multinucleated giant forms and abundant extracellular mucus. The cell outlines may be lost in the larger "physaliphorous" cells owing to marked cytoplasmic and intercellular vacuolation. Some cells may assume signet-ring forms. There were 2 cases in this series; 1 tumor occurred in the sacrococcygeal area (Fig. 18, *A* and *B*) and the other at the level of the second and third left lumbar vertebrae.

Extra - Adrenal Pheochromocytoma (Paraganglioma).—In this group there were 9 cases, with 5 male and 4 female patients, aged respectively 10, 12, 12, 27, 29, 44, 44, 49 and 68.

Chromaffin tumors clinically and pathologically similar to those that occur in the adrenal medulla can develop in the sympathetic gangliated chain, the celiac ganglion and the organ of Zuckerkandl, which is located above the bifurcation of the aorta.[36] The term "paraganglioma" is usually used to designate these tumors, but "extra - adrenal pheochromocytoma" seems preferable, because it is less confusing.

Fig. 16.—Hodgkin's disease of retroperitoneum in a woman aged 65. Note lateral displacement of left kidney and ureter by mass.

In 1 of the patients, a 12-year-old girl, a pheochromocytoma of the left adrenal gland was observed and removed, the girl returned with hypertension and a positive reaction to the benzodioxane test. A chromaffin tumor, cephalad and medial to the left adrenal gland, was excised, after which the patient made an excellent recovery (Fig. 19). Another patient, a 10-year-old girl, had two extra-adrenal pheochromocytomas, one of which involved the organ of Zuckerkandl. In 2 male patients, one a 12-year-old boy and the other a 41-year-old man, the pheochromocytomas were located on the posterior surface of the kidney. In 1 patient, a 59-year-old man, the extra-adrenal chromaffin tumor

TABLE 9.—*Tumors of Nerve Tissue*

1. *Neurilemmoma*

Case	*Patient Sex Age*	*Symptoms*	*Observations*	*Operation*	*Pathologic Diagnosis*	*Results*
1.	D. H. M 51	Constipation 1 year; mass in lower abdomen, palpable via rectum	Tumor filling entire pelvis	Exploratory: stony hard mass 22 cm. in diameter attached to parietes; biopsy	Neurilemmoma	Died of hypoprothrombinemia; autopsy, neurilemmoma of retroperitoneum
2.	G. V. M 54	Mass in left flank	Barium enema; transient arrest of barium in middle third of descending colon IVP; no displacement of ureters or kidneys	Mass near tail of pancreas adherent to aorta, thought to be cyst; excised in 3 pieces	Neurilemmoma	No recurrence; 2 year follow-up
			Malignant Schwannoma			
3.	J. B. M 43	Pain left flank 3 months; large abdomen 2 weeks; lost 35 lbs.	Greatly enlarged abdomen; barium enema, splenic flexure pushed down by large LUQ mass; G.I. series, pressure defect in stomach	Very large mass behind stomach and extending into it; biopsy	Malignant schwannoma	Death 4 days after operation; autopsy, malignant schwannoma of retroperitoneum with extension into stomach and small intestine
			2. *Sympathicoblastoma* (Extra-adrenal)			
1.	E. G. M 3	Pain in head and neck; inability to move leg; LMD found LUQ mass	Left kidney displaced, metastases to skull	Exploratory: inoperable retroperitoneal mass; biopsy	Sympathicoblastoma	Death
2.	G. D. M 4	Swelling of abdomen	IVP, nonfilling left kidney	Exploratory; biopsy	Sympathicoblastoma invading kidney and liver	Death
3.	J. D. M 21 Mo.	Mass in right side of abdomen found during examination	IVP, pattern normal; mass above right kidney displacing it downward	Death during operation; firm rubbery mass in right retroperitoneum above kidney	Retroperitoneal neuroblastoma	Autopsy, sympathicoblastoma of retroperitoneum; no tumor in adrenal

4.	T. Mc. F 2 Mo.	Bulge in back on left side; loss of weight	Cystic mass in left costovertebral angle 7.5 cm. in diameter	Meningitis developed; death before operation	Sympathicoblastoma	Autopsy, sympathicoblastoma of retroperitoneum with extension to quadratus lumborum, psoas muscle and spinal canal; left hydroureter and hydronephrosis
5.	D. F. M 16 Mo.	Pallor; abdominal mass; discovered accidentally	IVP, good excretion, right renal pelvis rotated; both kidneys displaced by large soft tissue mass	Exploratory: large mass pushing stomach up, transverse colon forward; highly vascular; biopsy	Sympathicoblastoma	Tissue culture by Dr. M. Murray showed neurites; death
6.	J. K. M 2	"Tumor under right eye" 8 months; pain in legs; protuberant abdomen	Hard mass in LUQ; IVP, left kidney markedly displaced; metastatic lesion in maxilla and zygoma	Exploratory: irregular mass in left flank to iliac crest; biopsy	Sympathicoblastoma	Death at home
7.	D. P. F 2	Weakness, anorexia; prominent right eye	IVP, right hydronephrosis; metastatic lesion to femur	Exploratory: mass near abdominal aorta to bifurcation	Sympathicoblastoma	Death 1 year after admission
8.	J. M. M 24 Mo.	Pallor; anorexia; enlarged abdomen 7 weeks	Stony hard mass in epigastrium, another in left flank; IVP, bilateral hydronephrosis and lateral displacement of kidney	Sternal puncture; metastatic(?) sympathicoblastoma cells		Jaundice; death; autopsy, sympathicoblastoma of retroperitoneum with metastases to liver, gallbladder, pancreas, right adrenal, stomach, duodenum, lymph node and sternum

3. *Partially Differentiated Ganglioneuroma*

1.	F. H. F 66	Mass in LUQ; constipation; no pain	Three masses in left flank and LUQ	Exploratory: large retroperitoneal mass, annular extension on transverse colon; cystic in omentum; biopsy: X-ray treatment	"Ganglioneuroma" of peritoneum	Autopsy, "ganglioneuroma" with extension to small and large intestine and abdominal wall
2.	J. M. F 8	Mass in LUQ since birth, thought to be enlarged spleen; operation refused	Large LUQ mass; IVP, left kidney displaced downward	Exploratory: mass 10 cm. in diameter pushing left adrenal and kidney down, spleen up and stomach forward; partly excised	Partially differentiated ganglioneuroma	Radiotherapy; being followed

TABLE 9 (Cont'd)—*Tumors of Nerve Tissue*

			4. *Ganglioneuroma*			
1.	R. W. F 6½	LLQ abdominal mass discovered during attack of scarlet fever, 1 month ago	Mass above symphysis on left side, hard, nontender	Extensive retroperitoneal mass adherent to bladder and ureter; biopsy	Ganglioneuroma	Reoperated on and mass 10×7×5 cm., weighing 440 Gm. removed; no recurrence at end of 6 years
2.	A. M. F 9	Abdominal mass 2 years	IVP, left ureter displaced laterally	Mass 10×12 along lumbar vertebrae on left side; biopsy	Ganglioneuroma	Radiotherapy
3.	J. LaP. F 18	Discovered retroperitoneal mass during Cesarian section	IVP, no abnormality	Encapsulated tumor in retroperitoneum in hollow of sacrum; biopsy	Ganglioneuroma	Second cesarean 5 years later; tumor inspected; no larger
			5. *Chordomas*			
1.	H. M. M 44	Pain and swelling in RLQ 5 months; backache 4 years	Large mass to left of umbilicus; IVP, both kidneys displaced laterally; bilateral hydronephrosis, L2, L3, L4 destroyed	Decompression of cord; biopsy of mass in flank	Chordoma of retroperitoneum following chordoma of(?)lumbar vertebrae	Terminal
2.	N. L. M 58	Constipation; dysuria 6 weeks; pain in sacroiliac region	X-ray; rarefaction in sacral segments	Exploratory: large bilobular mass in sacrococcygeal region; biopsy	Chordoma of sacrococcygeal region	Roentgen therapy; gluteus maximus invaded; death; metastases to regional lymph nodes, liver, pleura, lungs and skin of legs (Fig. 18, *A* and *B*)

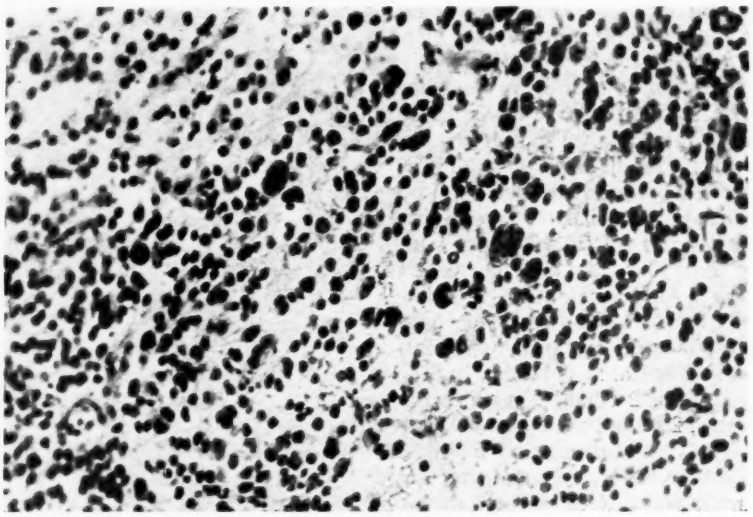


Fig. 17.—Partially differentiated ganglioneuroma. Note large cells.

caused sudden death. The patient was being treated for a fracture of the ankle when he suddenly became cyanotic and dyspneic and died of what was thought to be an attack of coronary thrombosis. Autopsy revealed an extra-adrenal pheochromocytoma with metastases to the liver and lymph glands. Another patient, a man aged 68, was thought to have a cyst of the pancreas, but he died after an exploratory operation and autopsy revealed a malignant extra-adrenal pheochromocytoma with metastases to the liver.

Table 10 summarizes the 9 cases.

Cysts.—Cysts occurred in 10 cases, with 3 male and 7 female patients aged respectively 22, 34, 36, 39, 40, 43, 45, 48, 48, 49 and 50. Cysts are less common than solid tumors. They may be intramesenteric or retroperitoneal. They sometimes extend from the renal fossa to the pelvic floor.[37] Cysts tend to expand slowly and reach an enormous size without causing symptoms. They may displace the ureter and/or other organs without causing obstruction or disturbance of function. Patients occasionally complain of vague abdominal discomfort or a dragging sensation. Most frequently the mass is discovered during routine abdominal palpation. It is apt to be freely movable and balottable.

The majority of retroperitoneal cysts are said to form from mesodermal rests (wolffian body or mullerian duct[38]). Cysts of wolffian remnants are more common, particularly in females. Mullerian duct cysts are apt to lie in the midline, above the prostate, between the bladder and the rectum. Landes and Ranson[39] reported the fifteenth case in 1949. Dermoid, lymphatic, traumatic (hemorrhagic or hygromal), and parasitic cysts have been reported.[40] Dermoid cysts may be suspected when roentgenograms reveal a shadow resembling a tooth. They may contain hair, sebaceous material and other ectodermal derivatives. Dermoid cysts are sometimes classified with retroperitoneal teratomas. Lymphatic, chylous cysts are derived from offshoots of the thoracic duct of receptaculum chyli,[44] They may be solitary cystic or multilocular; if the latter, they resemble lymphangioma. Perirenal, i. e., peripelvic or hilar lymphatic cysts are not uncommon.[42] Ureteral or pelvic extravasations may form cystic masses, and a hygroma may result from a retro-

peritoneal hematoma following accidental trauma or spontaneous rupture of a blood vessel. Epithelial cysts are lined with columnar epithelium with a "brush" border or, more frequently, with low cuboidal or flattened epithelium. The fibrous wall is usually thin, and in cysts that develop from wolffian remnants one usually finds small tubules and structures resembling glomerules. A rim of calcification, when present in the cyst wall, may be demonstrated on a roentgen film.[43] Cysts may be filled with lymph, blood, colloids, pseudomucus or parasitic material (Fig. 20).

Teratoma.—Teratoma appeared in 5 patients, 3 male and 2 female, aged respectively 1 month, 22 months, 6 years 7 years and 40 years. A teratoma, according to Willis,[13] is a true tumor or neoplasm composed of multiple tissues foreign to the part in which it arises. It probably forms from foci of pluripotential embryonic tissue which escaped from the influence of the primary organizers during early embryonic development. Particular teratomas can be designated as benign or malignant (teratocarcinoma), according to their degree of differentiation or their behavior.

Teratomas occur, in order of frequency, in the ovaries, testes, anterior mediastinum, *retroperitoneal region, presacral* and *coccygeal* regions, pineal and other intracranial sites, neck, and abdominal viscera other than the gonads.[9] Retroperitoneal presacral and coccygeal teratoma appears to be a little more frequent in the female than in the male. In the case of the latter it is important to rule out metastasis from a primary testicular growth.[44]

The majority of retroperitoneal teratomas tend to arise high, close to the mesenteric artery, celiac artery, pancreas and kidney. The teratoma reported by Gale and Willis[45] was behind the pancreas. Baker and Rogers reported a pararenal teratoma in a 10-year-old Negress. The mass, the size of an orange, was under the base of the transverse mesocolon and against the upper pole of the left kidney. The pancreas was located on the upper margin of the mass.

TABLE 10.—*Extra-Adrenal Pheochromocytoma*

Case	Patient Sex Age	History	Observations	Operation	Pathologic Diagnosis	Results
1.	J. L. F 12	Excessive perspiration, loss of weight, 2 years; BP 180/120, BM 51.1; positive Benzodioxane reaction; pheochromocytoma left adrenal removed; patient admitted 11 months later with persistent hypertension	BP 192/128; positive benzodioxane reaction	Exploratory; tumor cephalad and mesial to left adrenal gland in retroperitoneum	Extra-adrenal pheochromocytoma	Recovery; BP 110/60; gained 20 lbs. (9.1 Kg.)
2.	D. B. F. 10	Excessive perspiration; nervousness	Positive benzodioxane aerograms of adrenal normal; BP 210/160	Exploratory; pheochromocytoma at bifurcation of aorta and another in epigastric fossa	Pheochromocytoma of right adrenal and of organ of Zuckerkandl	Recovery; BP normal

3.	P. D. M 12	Excessive sweating, headache, vomiting, pounding heart	BP 270/210; positive benzodioxane reaction; X-ray, small right kidney	Exploratory: removal of right kidney with attached tumor of posterior inferior surface	Extra-adrenal pheochromocytoma 8 × 4 × 1.5 cm., 56.5 Gm.	Improved; BP 120/80
4.	D. P. F 27	Known to have high blood pressure and mass in left side of abdomen; biopsy, neurocytoma; roentgen treatments	BP 240/140, BM 47	Exploratory: tumor in left retroperitoneum invading aorta and left ureter; biopsy only	Extra-adrenal pheochromocytoma	Death during operation; autopsy, pheochromocytoma of left lumbar region
5.	E. R. F 29	Attacks of hypertension; loss of weight; palpitations; mass in RUQ	BM 25, BP 248/150; IVP, right kidney displaced downward	Exploratory: inoperable tumor of retroperitoneum; biopsy	Extra-adrenal pheochromocytoma	Radiotherapy
6.	T. P. M 44	Anorexia; weakness; loss of weight; glycosuria; firm mass in LUQ	X-ray; soft tissue in abdomen 4 × 5 cm. to left of lumbar spine; left kidney displaced	Exploratory; mass close to tail of pancreas and aorta; biopsy		Shock; death next day; autopsy, pheochromocytoma of para-aortic region
7.	J. T. M 68	Enlarging abdominal mass 18 months; loss of weight	X-ray; large shadow containing calcific deposits; barium enema; colon displaced by mass	Exploratory: spongy retroperitoneal mass in RUQ and flank; several other masses nearby, one in pancreas	Malignant pheochromocytoma	Death 1 week later; autopsy, pheochromocytoma of right retroperitoneal region with metastases to liver
8.	G. B. B. M 59	Pain in ankle following fall; cast applied in clinic; BP 110/75; returned with nausea and headache; BP 175/120	None	No operation; sudden attack of cyanosis, dyspnea; coronary disease suggested		Sudden death in ward shortly after admission; autopsy, malignant pheochromocytoma of right kidney with metastases to liver and lymph glands, compression of inferior vena cava
9.	H. B. M 41	Repeated attacks of headache, palpitation, sweating of 11 years' duration; nausea and vomiting	BP 280/150 during attack; 80/50 in interval, positive histamine reaction; aerogram; ?mass above left kidney	Encapsulated tumor 2 cm. medial to pelvis of left kidney	Extra-adrenal pheochromocytoma, 332 Gm., above left kidney	Good recovery; BP 120/80

UNIVERSITY OF MICHIGAN LIBRARIES

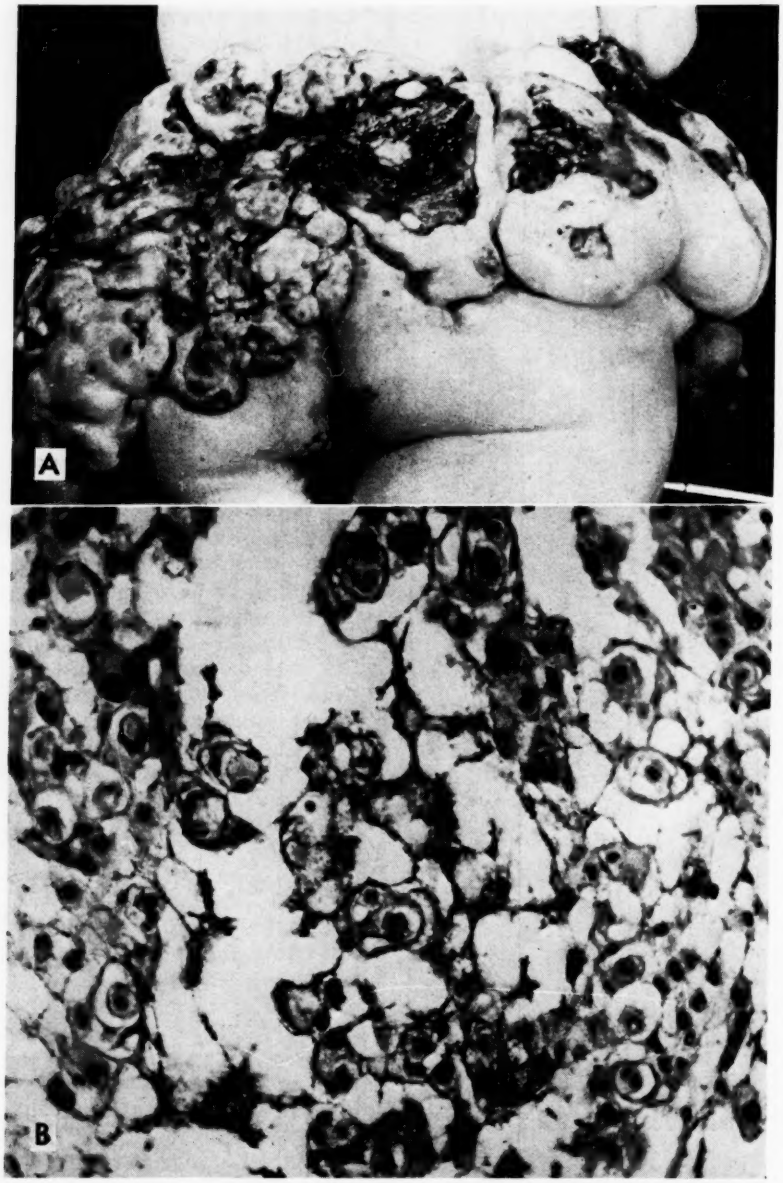


Fig. 18.—*A*, extensive spread from a chordoma of sacrococcygeal region in a 58-year-old man. *B*, photomicrograph of chordoma. Note polyhedral vacuolated cells.

Five patients with diagnoses of teratoma of the retroperitoneum are presented in this review. The diagnosis in 1 may be questioned. The patient, a 1-month-old infant, had a cystic mass that seemed to arise from the hollow of the sacrum.

One of our cases (Case 5) was similar to that of Gale and Willis. The patient was

TABLE 11.—*Cysts*

Case	*Patient Sex Age*	*History & Observations*	*Operation*	*Diagnosis*
1.	D. G. F 22	Dull upper abdominal pain 36 hours; mass in right lower quadrant	Excision of cystic mass in lower abdomen above pelvis	Cysts of retroperitoneal tissues (lymphatic)
2.	D. G. M 34	Progressive enlargement of right upper abdominal region	Excision of cystic mass in right posterior flank	Retroperitoneal cyst
3.	N. S. F 36	Mass in RLQ	Excision of thin-walled cyst lateral to ascending colon and extending from brim of pelvis to region of kidney	Retroperitoneal serous cyst 16x11, 5x8 cm
4.	R. W. F 39	Abdominal mass; IVP showed lower right pole, right kidney, ureter displaced mesially; no dilatation	Exploratory; removal of thick-walled cyst (25 cm.) attached to diaphragm and ribs, containing 1,000 cc. fluid and displacing liver anteriorly and medially; kidney and adrenal removed with cyst	Retroperitoneal cyst
5.	J. C. M 40	Lower left chest pain and fever 5 mo.; mass in region of left kidney	Exploratory; excision of cyst lateral to left kidney, 5 cm. in diameter	Retroperitoneal cyst, secondary to hematoma (?), hygroma (?)
6.	B. R. F 43	LMD discovered rt. abdominal mass in routine examination	Exploratory; excision of retroperitoneal cyst of right side 7x1 cm.; 39.5 Gm.	Retroperitoneal cyst (Wolffian origin (?))
7.	K. O'D. F 45	Abdominal mass, displacing left ureter mesially; calyceal system intact	Exploratory; excision of retroperitoneal cyst 17.5 cm. in diameter; kidney removed with cyst	Retroperitoneal cyst (Wolffian rest (?))
8.	H. S. F 48	Vague lumbar discomfort 3 mo.; orange-shaped mass LLQ; retrograde pyelograms "negative"	Exploratory; excision of cyst 9-10 cm. in diameter under lateral peritoneal reflex of descending colon	Retroperitoneal cyst
9.	G. K. M 49	LMD discovered mass left side of abdomen, not fixed	Exploratory; excision of cyst containing over 1 L. fluid	Retroperitoneal cyst
10.	B. H. F 50	Mass in lower part of abdomen	Exploratory; partial excision of cyst in cul-de-sac containing yellowish brown thin fluid	Cyst of undetermined origin

... OF MICHIGAN LIBRARIES

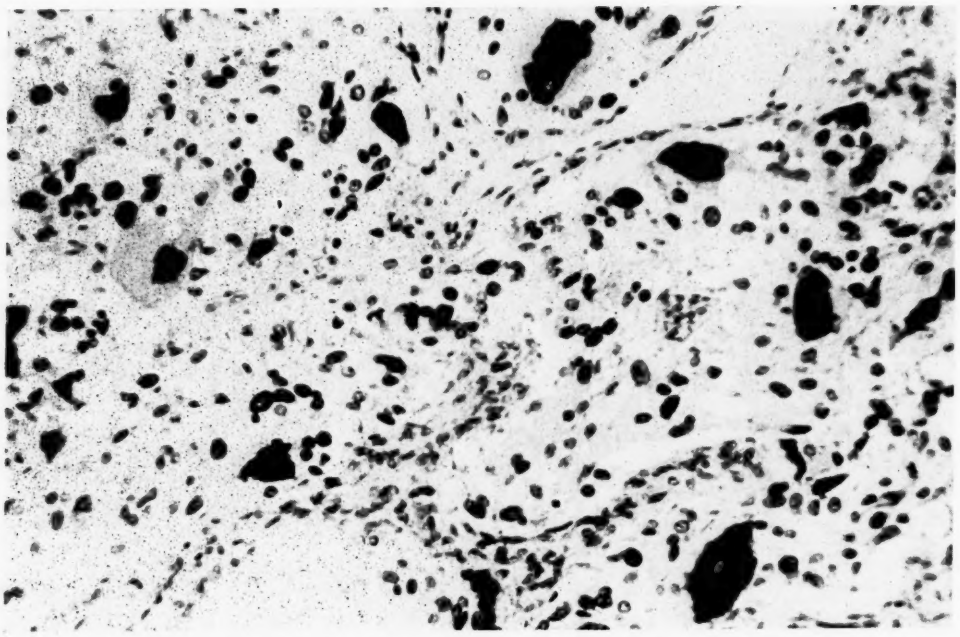


Fig. 19.—Extra-adrenal pheochromocytoma (Case 1). Note giant deep-staining nuclei. Tumor was benign.

a 40-year-old man who had a four-year history of constipation and abdominal cramps. Appendectomy was performed, with drainage of a pancreatic cyst. The cyst was marsupialized, but the patient continued to have pain and fever. Roentgenograms of the abdomen revealed shadows suggestive of teeth in the region of the retroperitoneal mass behind the pancreas. The patient was operated on, and a retroperitoneal mass extending into the mesocolon was removed. The major portion of the tumor was plastered down to the posterior abdominal wall and could not be removed. Autopsy revealed a teratoma of the retroperitoneum, with carcinoma. It extended into the preaortic lymph node, the mesocolon of the left transverse colon, the inferior vena cava, the psoas muscle, the left iliac fossa and the vertebrae. The cauda equina was compressed.

Carcinoma. — There were 10 cases of carcinoma; 6 of the patients were male and 4 were female. The age range was from 2 months through 31, 53, 54, 61 64, 65, 68 and 71 years.

Considerable difficulty accompanies the diagnosis of retroperitoneal carcinoma. There is the question as to whether the tumor is primary or secondary. If the former, then one must exclude mixed tumor, a mesothelioma variant, carcinoma of a wolffian or mullerian remnant, etc. This is not always possible. A careful search for a distant focus usually determines whether the tumor is metastatic, but sometimes time only can reveal the cryptic primary site. In this series, 10 patients were encountered in whose cases a retroperitoneal carcinoma was discovered.

Xanthomatosis; Xanthogranuloma. — The cases of 3 men and 1 woman were in this group. Their ages were 63, 54, 51, and 44 years respectively. In 1935, I[46] reported 4 cases of xanthomatous lesions

involving the urinary tract. There were 2 patients with xanthomatous infiltrations of the kidney, 1 with a xanthomatous lesion in a carcinoma of the prostate gland and 1 with a xanthogranuloma of the retroperitoneum. The case of the last-mentioned patient also called attention to xanthomatous nodules, which are not infrequent in degenerating areas of a renal malignant growth. The golden color of all these lesions was emphasized, and it was established that the cell unit of any xanthic mass is the "foam cell." This is a reticulo-endothelial cell which has phagocytized accumulations of lipoids (cholesterol esters, cholesterol, neutral fats), lipoid pigments and, to a lesser degree, blood pigments. Proliferation of these histiocytic lipoid-laden cells impart the striking color to the lesion. "Foaminess" results from solution of lipoids during routine preparation of tissue for staining. When the fats are preserved, special stains, such as scarlet red, reveal a characteristic microscopic picture: large cells laden with bright red globules.

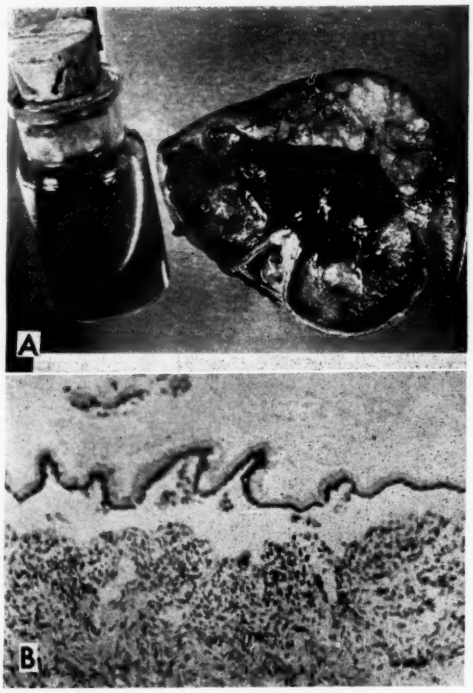


Fig. 20.—*A*, cyst of retroperitoneum in a female patient (Case 1), courtesy of Dr. R. Lattes, *B*, cyst (Case 6) occurring in a female patient. Cyst is probably of wolffian origin.

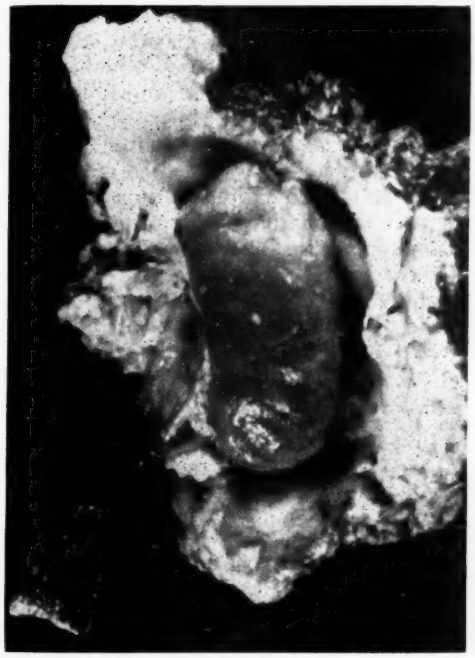


Fig. 21.—Perirenal lipomatosis which produced a palpable mass in flank.

Tumors of histiocytic foam cells are rare and are called xanthomas or xanthosarcomas.[47] The xanthogranuloma represents merely a specific cell response to a particular irritant, similar in development to inflammatory granuloma or lipogranuloma. The accompanying inflammatory process aids in differentiating the condition from tumor.

When a constitutional deficiency in lipoid metabolism exists, extensive histiocytic accumulations, local or general, may occur. A characteristic localization appears to be in the retroperitoneal space, where the xanthomatous lesions may extend widely and simulate a tumor mass.[47a] They may extend downward from the

pararenal areas to the scrotum. The kidney and adrenal gland may be engulfed in the xanthomatous process, which grows slowly and tends to recur. Hand-Rowland's disease[47a] is an example of a generalized xanthomatosis. The cell-unit in all lesions is the foam cell. For purposes of classification and clarification one may roughly compare lipomatous with xanthomatous lesions as shown in Table 14.

There were 4 patients with xanthomatous involvement of the retroperitoneum in the present series.

CASE 1 (E. K., aged 54).—Clinically the patient showed fatigue, fever, nocturia and dyspnea. Bilateral masses were palpated in the abdomen and were interpreted as polycystic kidneys. Exploratory celiotomy, however, revealed a large retroperitoneal mass. Biopsy showed a xanthomatous lesion of the retroperitoneum infiltrating the kidney. The patient was readmitted with severe pain in the chest, loss of weight, edema of the ankles and an enlarged liver. Roentgenograms of the thickened tibia showed coarse trabeculation, and biopsy again showed a xanthomatous lesion. The patient died, and at autopsy generalized xanthomatosis was observed, involving the retroperitoneum, both kidneys, the adrenal capsule, the pericardium, the aortal adventitia, the pelvic peritoneum, the liver, the pancreas, the pituitary gland and the bones. The diagnosis was diffuse xanthomatosis (Fig. 22*A*).

CASE 2 (J. DeR., a man aged 51).—The clinical course was marked by distress after meals, pain in the left upper quadrant of the abdomen, fever and weakness of two months' duration. A large mass was palpable in the left upper abdominal quadrant. Exploratory celiotomy revealed a mass extending from the subphrenic space to the brim of the pelvis and across the midline. It was adherent to the parietal peritoneum. The stomach and pancreas were pushed forward. A fistula of the colon surrounded by a large retroperitoneal abscess with thick walls of brownish tissue was found. Biopsy revealed a xanthogranu-

CASE 3 (L. O., a woman aged 44).—Clinically there was pain in the right side of Clinically there was pain in the right side of the abdomen, with vomiting of three weeks' duration. A nontender mass was palpated to the right of the umbilicus. Roentgenographic studies showed a shadow superimposed on the

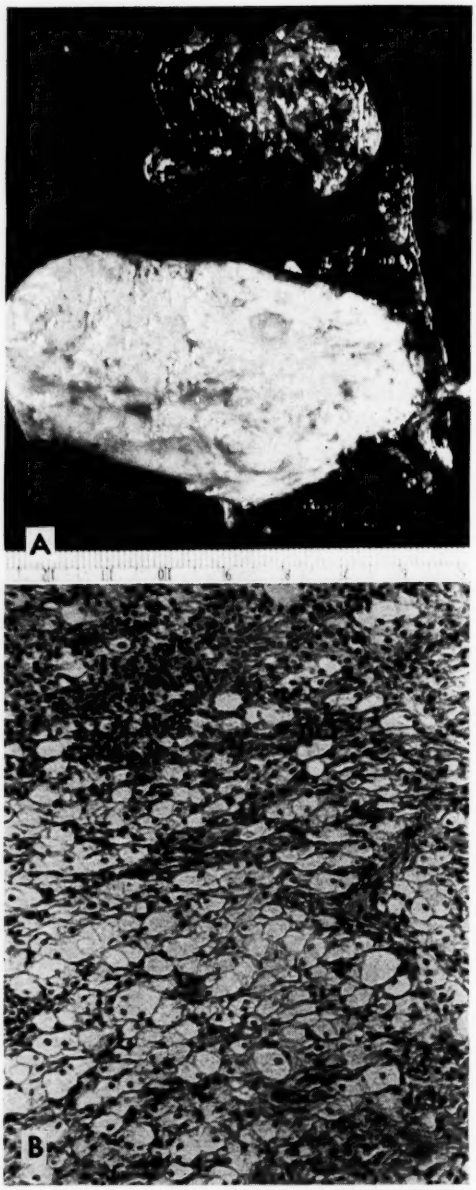


Fig. 22. — *A*, xanthogranuloma of retroperitoneum from a man aged 51 (Case 2), courtesy of Dr. R. Lattes. *B*, xanthomatosis of retroperitoneum in a man aged 54 (Case 1). Note foam cell mass.

right kidney and almost of the same density as the kidney. A barium colon enema indi-

TABLE 12.—*Teratoma*

Case	*Patient Sex Age*	*History*	*Observations*	*Operation*	*Pathologic Diagnosis*	*Results*
1.	W. M. M 1 mo.	Straining at stool; vomiting; mass palpable via rectum and in suprapubic region	IVP; bladder shadow pushed to right, left ureter displaced laterally	Cystic mass, 15 x 10 cm. with clear fluid, filling pelvis and displacing rectum and sigmoid to left and bladder to right, seems to arise from seminal vesicle or prostate	Adult teratoma (nerve elements, epithelial tissue, striated and smooth muscle, and hemangioma)	No recurrence, 3-year follow-up
2.	V. C. F 22 mo.	History of fall 10 months ago; constipation and tenesmus 18 days; abdominal mass 10 days	LUQ filled with hard mass	Cystic vascular mass arising from retroperitoneum at level of 1st and 2nd lumbar vertebrae; liver studded with grayish masses; biopsy	Teratoma (teeth, cartilage)	X-ray of specimen revealed 4 teeth; edema developed in right lower extremity; death 18 days after operation
3.	S. C. F 6	Rectal mass and constipation 1½ years; paraumbilical pain relieved by defecation; ribbon-stool	B.E., rectum displaced anteriorly; hard mass 2 cm. above anal orifice	Excision of presacral and precoccygeal cystic mass 6 cm. in diameter	Teratoma (squamous epithelium, fibrous tissue, cysts, nerve tissue, cartilage)	No recurrence; 5-year follow-up
4,	T. T. M 7	Fever and abdominal pain 4 days; mass discovered during examination	Irregular mass in LUQ	Excision of cystic mass (8x7x6 cm.) from retroperitoneum at level of third portion of duodenum	Teratoma (fragments of hairs, intestinal tissue, nerve fibers)	No follow-up
5.	E. P. M 40	Abdominal cramps and constipation 4 months; tender in RLQ; appendectomy and marsupilization of what seemed to be a pancreatic cyst; pain persisted	X-ray of abdomen revealed shadows suggestive of teeth behind region of pancreas	Inoperable retroperitoneal mass behind pancreas and extending into mesocolon		Died; autopsy teratoma with carcinomatous element; extension into preaortic lymph nodes, mesocolon, inferior vena cava, psoas muscle and vertebrae; cauda equina compressed

TABLE 13.—*Carcinoma*

Case	*Patient Sex Age*	*History*	*Observations*	*Operation*	*Pathologic Diagnosis*	*Results*
1.	W. C. M 2 Mo.	Abdominal mass discovered by physician called because of fever and cough for 4 days	Mass in left flank	Exploratory: partial excision of firm, fixed mass near left iliac artery	Carcinoma of unknown origin	Radiotherapy; 11 years later appendectomy, no evidence of tumor
2.	F. S. M 53	Mild backache; pain in right calf; numbness of leg, for several months	Firm mass in RUQ	Exploratory: large encapsulated mass, vascular, eroded bone; biopsy	Carcinoma of retroperitoneum with osteoid formation	Terminal care
3.	E. P. M 29	Dull abdominal pain large left varicocele	Mass in left flank	Exploratory: retroperitoneal cyst like mass pressing against left kidney; inoperable; biopsy	Anaplastic carcinoma	No follow-up
4.	E. H. F 61	Constipation; pain in lower abdomen for 3 weeks	Hard, fixed mass in pelvis extending to umbilicus; barium enema; sigmoid colon displaced upward	Partial excision of retroperitoneal pelvic mass	Anaplastic carcinoma	Mustard gas therapy; died 1 month after operation
5.	J. C. M 37	Colicky right flank pain; mass in RLQ of abdomen	IVP; right ureter displaced, angulated	Exploratory: deep-seated mass involving right ureter, inferior vena cava; biopsy	Carcinoma of retroperitoneum	Radiotherapy; death 23 months after operation
6.	H. C. M 65	Abdominal cramps 2 months; loss of weight; duodenal polyp removed years ago	G.I. series; lesion at pylorus (?)	Stomach negative; hard, smooth mass below pancreas extending into it; biopsy	Anaplastic carcinoma of retroperitoneum	Radiotherapy; death
7.	J. C. M 71	Recurrent epigastric pain, weakness, vomiting 6 weeks	Epigastric mass; G.I. series, (?) neoplasm of stomach (?)	Exploratory: G.I.; tract normal; large mass in LUQ below left lobe of liver; biopsy	Anaplastic carcinoma	Radiotherapy; death 3 months after operation

8.	E. R. F 54	Carcinoma of fundus of uterus removed 1½ years ago; now pain in left groin	Large mass in left flank	Exploratory: mass from level of left kidney to pelvis and across behind pancreas; biopsy	Anaplastic carcinoma	Terminal
9.	M. S. M 68	Hematuria for 4 days; loss of weight	Abdomen, no masses; mass high in rectum	Exploratory: large mass above levator ani and prostate, between bladder and rectum; biopsy	Carcinoma of retroperitoneum	Radiotherapy; terminal care
10.	E. B. F 64	Upper abdominal pain, fever, loss of weight	Tumor right side of abdomen; kidney displaced	Exploratory; mass thought to be tumor of adrenal; biopsy	Sympathicoblastoma ? Lymphosarcoma	Death; autopsy, undifferentiated carcinoma of retroperitoneum

cated a slight filling defect of the ascending colon just below the hepatic flexure. Cystoscopic and pyelographic studies gave negative results. The urine showed a few white blood cells. At operation it was observed that the ascending colon was indurated, and a sinus tract extending from it to the lower pole of the right kidney was present. Orange-colored pus exuded from the tract, and numerous yellowish nodules lined the tract and surrounded the colon. Examination of the excised tissue showd a xanthogranuloma of the retroperitoneum.

CASE 4 (case of U. H., a man aged 62).—The clinical symptoms consisted of chills, fever and nausea off and on for six months. The patient had a vague sense of a mass in the upper part of the abdomen. Gastrointestinal roentgen studies showed a distortion of the duodenum suggestive of a tumor either in that organ or in the head of the pancreas. Exploratory operation revealed pinkish fluid in the peritoneal cavity but no evidence of malignant change in the gastrointestinal tract or the pancreas. The root of the mesentery and the retroperitoneum, however, were filled with firm nodular masses which, when subjected to biopsy, proved to be xanthogranuloma. The patient died at another hospital, and the autopsy diagnosis was xanthoma of the retroperitoneum.

Retroperitoneal Hematoma.—Retroperitoneal hematoma is probably more common than reports indicate. This tumor may be associated with periarteritis nodosa, vascular dyscrasias such as polycythemia and purpura, or trauma. It may result from rupture of an arteriosclerotic aneurysm. A slowly forming hematoma may become organized. In some cases the serum is walled off and a cystlike mass can form, which is often labeled hygroma.

In both of the cases in this series the patients were men; G. B., aged 54, and J. C., aged 80. Both had large arteriosclerotic aneurysms of the abdominal aorta. Both complained of recurrent attacks of pain in the left lumbar region, culminating in sudden, excruciating pain. This was followed rapidly by collapse, air hunger and shock. In both patients palpation of the abdomen revealed a deep-seated mass. Both died, and autopsy revealed the ruptured aneurysms and retroperitoneal he-

TABLE 14.—*Comparison of Lipomatous with Xanthomatous Lesions*

Tumor: Benign	Lipoma	Xanthoma
Malignant	Liposarcoma	Xanthosarcoma (?)
Inflammatory	Lipogranuloma	Xanthogranuloma
Metabolic defect:		
(?) Localized	Lipomatous infiltr.	Xanthomatous infiltr.
Diffuse	Lipomatosis	Xanthomatosis

matomas. In the 54-year-old man an attempt had been made to stop the bleeding by means of a slingshot rubber band placed around the aorta between the points of origin of the renal artery and the base of the aneurysm.

SUMMARY AND CONCLUSIONS

1. The clinically silent retroperitoneum is an ideal site for unhampered growth of tumor cells. The posterior abdominal wall offers a solid barrier to expanding retroperitoneal masses, but the soft abdominal viscera anteriorly, and some of the neighboring retroperitoneal organs sagittally, "move over and make room." Retroperitoneal tumors can therefore attain an enormous size without causing significant symptoms.

2. When a retroperitoneal neoplasm begins to compress, obstruct or grow into an organ or structure, significant complaints develop. The symptoms depend on the site of origin and direction of spread of a retroperitoneal mass. Masses arising in the upper part of the retroperitoneum on the right side may cause symptoms that resemble those of disease of the gallbladder, liver, kidney or adrenal gland; arising on the left side, they may cause complaints suggestive of peptic or duodenal ulcer, splenic disorder, disease of the adrenal gland, etc. Masses arising in the lower portion of the retroperitoneum on the right side may cause complaints suggestive of appendicitis, colitis, ileitis, ureteral block, adnexal disease, etc.; on the left, they may cause complaints suggestive of diverticulitis, obstructions of the descending colon, ureteral block, adnexal disease, etc. Masses in the upper part of the midretroperitoneum may suggest pancreatic or duodenal pathologic change, and those in the lower midretroperitoneum may simulate vesical or uterine disorders. Troublesome enlarged hemorrhoids and rectal tenesmus are prominent symptoms in patients with presacral neoplasms.

3. The discovery of an abdominal mass is the most frequent single sign. The mass is usually nontender. A fixed, hard mass suggests malignancy; a soft or tense ballotable one may be a benign neoplasm or cyst. The tumor tends to be vague and indefinable if the patient is obese or if the mass itself is small or deep-seated.

Pain in the early stages is vague and is usually described as "backache," "a tired feeling," "discomfort"; "a dragging sensation" or "a bloated feeling." Later it tends to become severe, radicular and unbearable.

Other late symptoms are ascites, dilation of the abdominal veins, edema of one or both lower extremieies, pronounced gastrointestinal or urinary disturbances, partial or complete ileus, hemorrhage, fever, anorexia, loss of weight, etc.

4. Patients suspected of having a retroperitoneal tumor should be investigated along the following lines: 1. Gastrointestinal and barium enema roentgen studies should be performed to locate and delineate possible displacements, distortions, obstructions, etc. 2. Intravenous and retrograde urographic studies are needed to demonstrate possible displacements of the ureter and/or kidney or compression of the bladder. The ureter is the "pointer" of the retroperitoneum. Study of the direction and extent of its displacement aids in locating and partly outlining a

retroperitoneal mass. The ureter is also the "weathervane" of the retroperitoneum: displacement without distortion of the lumen occurs with benign tumors, cysts or early malignant tumors. Narrowing, distortion or complete obliteration of the ureteral lumen occurs with invasive tumors. Displacement of the kidney without distortion or hydronephrosis suggests a benign or early malignant lesion, whereas dilatation, distortion or obliteration of the calyces suggests invasive malignant disease. Poor excretion of dye, or none occurs in cases of advanced renal or ureteral involvement by a retroperitoneal malignant tumor.

The employment of presacral aerograms is directed toward producing retroperitoneal "emphysema" in order to obtain a better roentgenographic contrast between the dense and less dense retroperitoneal bodies. It is a relatively simple and painless procedure—as much as 1,500 cc. of air may be injected. It illustrates how a mass can expand and infiltrate the retroperitoneal space without much disturbance. The air outlines small or moderate-sized tumors clearly, but very large ones usually block the upward spread.

5. A classification based on a study of 162 *primary* retroperitoneal tumors is presented. Neoplasms of the adrenal glands, kidneys, pancreas, liver, duodenum and spleen have been omitted from the review.

6. The ratio of malignant to benign tumors was 4 to 1 (124 to 32). Retroperitoneal xanthomatous lesions and hematomas were omitted from the calculation.

7. The lymphomas constitued the largest group (48 cases). There were 41 reticulum cell sarcomas, 6 instances of Hodgkin's disease and 1 retroperitoneal leukemic infiltration in a patient with leukemia. There were 29 male and 19 female patients. In the majority of cases symptoms had been present for six months or less. The roots of the mesenteries were most frequently involved. The disease was at times multifocal, and in some of the cases the abdominal involvement may have been secondary.

The lipomatous tumors were next in frequency (20 cases), and here female patients predominated (12 to 8). The greatest incidence was between the ages of 40 and 69 (16 cases). (Lipomatous neoplasms can grow to enormous size and remain symptomless for a long time. They tend to recur locally. Many show myxomatous changes.)

Tumors of smooth and striated muscle tissue origin occurred in 18 cases. Two-thirds of the patients were seen between the ages of 40 and 60. Two were 1 year of age. All those with leiomyosarcoma died of local recurrences, extension into the veins or invasion of the liver and other nearby organs.

There were 18 nerve cell tumors, of which the extra-adrenal sympathicoblastoma occurred most frequently (8 cases) and was most malignant. All of the patients suffering from sympathicoblastoma died of local recurrences and/or extensions into the liver, etc., and/or skeletal metastases. The partially differentiated ganglioneuromas (2 cases) were less malignant. Three benign tumors were diagnosed as well differentiated ganglioneuromas. Two chordomas were included in the series, because in each instance the presenting symptom was retroperitoneal mass. In 1 case this mass was located in the lumbar region; in the other it arose in the hollow of the sacrum.

Nine extra-adrenal pheochromocytomas (paragangliomas) were encountered, 6 benign and 3 malignant, in 5 male and 4 female patients. Three of the patients were children aged 10, 12 and 12 years respectively, and all made excellent postoperative recoveries. The tumors in the 9 cases were located as follows: near the adrenal glands, 4; in the region of the kidneys, 4; near the tail of the pancreas, 1; in the lumbar region, 3, and at the bifurcation of the aorta (organ of Zuckerkandl), 1. Two of the patients had multifocal lesions, and in 3 the tumors were malignant. An extra-adrenal pheochromocytoma may be the cause of "sudden death." One of the patients, while being treated in the clinic for an ankle fracture,

died suddenly of what appeared to be a heart attack (Case 8). Autopsy revealed a malignant extra-adrenal pheochromocytoma. Three of the patients died during or shortly after an exploratory operation for an abdominal mass. (Pheochromocytomas tend to be soft, friable and brownish.)

Of tumors arising from embryonal rests there were 10 cysts and 5 teratomas. Of the 10 with cysts, the majority (7) were female. Nine of the patients were between the ages of 34 and 50. The cysts were tense but painless and ballotable. Five were located in the right lumbar region, 4 in the left lumbar region and 1 in the hollow of the sacrum. The cysts were benign and in the female patients probably represented wolffian remnants, while in the male patients they may have formed from mullerian rests.

Of the 5 patients with teratoma, 3 were male and 2 female. Four of the tumors occurred early in life, (7 years or younger). In 2 of the patients, aged respectively 1 month and 6 years, the teratoma was located in the hollow of the sacrum. Both patients made excellent postoperative recoveries, and there were no recurrences aftr three and five years respectively. In the remaining 3 cases the teratoma was located in the upper middle portion of the retroperitoneum: at the level of the first and second lumbar vertebrae, behind the pancreas and behind the descending duodenum respectively. Two of the patients died shortly after the operation. In none of the male patients was there any obvious lesion of the disease in the testis.

There were 12 patients with tumors of fibrous tissue origin. One of these tumors was benign, the remainder malignant (fibrosarcoma). The latter grew rapidly and invaded locally, and all the patients but 1 died of the diease.

In 10 cases a diagnosis of primary retroperitoneal carcinoma was made. No other focus was found in spite of diligent search. All of the patients except 1 died after an exploratory operation.

There were 3 mesenchymomas, 2 mesotheliomas and hemangiopericytoma in the series. Four patients had xanthomatous lesions of the retroperitoneum. In 1 the process infiltrated the retroperitoneum and, like lava, engulfed and seeped into the kidney. A discrete xanthoma was removed from another patient, and the remaining 2 had retroperitoneal xanthogranulomas. Two instances of large retroperitoneal hematoma due to ruptured aneurysm of the aorta were included. In each the preoperative sign was a deep-seated abdominal mass.

A number of cases (more than 20) were omitted from the review because, although each of the patients had an obvious retroperitoneal mass, no biopsy specimen was obtained.

Author's Note: I wish to express my sincere thanks to Drs. G. Cahill, A. P. Stout, H. Smith, R. Lattes and D. Anderson for use of material and for their kindness and cooperation. My thanks also to Mrs. Lydia Titus for efficient secretarial work.

RESUMEN

Se presenta una extensa revisión y un análisis estadístico de 192 casos de tumor retroperitoneāl primario. Después de una discusión concisa sobre la anatomía, patología, etiología, diagnóstico y aspecto roentgenológico del tema, el autor trata cada uno de los crecimientos primarios retroperitoneales. La lista incluye fibroma, fibrosarcoma, lipoma, liposarcoma, leiyomioma, leiyomiosarcoma, hemangiopericitoma, mesenquimoma, tumores linfóides, enfermedad de Hodgkin, mesotelioma, neurilemoma maligno, ganglioneuroma, cordoma, feocromocitoma, tumores quísticos, teratoma, carcinoma, xantogranuloma, y hematoma retroperitoneal. Se presentan en forma de cuadro detalles sobre los 192 casos.

En la opinión del autor el retroperitoneo, que es "clinicamente silencioso" es un sitio ideal para el crecimiento difuso de las células tumorales. Por consiguiente los tumores retroperitoneales pueden y a menudo adquieren gran tamaño sin causar sintomatología significativa.

RIASSUNTO

L'Autore presenta una esauriente rivista e un'analisi statistica di 192 casi di tumore primitivo retroperitoneale. Dopo una concisa discussione sull'anatomia, anatomia pathologica, etiologia, diagnosi e quadro radiologico del soggetto, l'Autore considera ogni tipo di tumore primitivo retroperitoneale. L'elenco comprende: fibromi, fibrosarcomi, lipomi, liposarcomi, leiomiomi, leiomiosarcomi, emangiopericitomi, mesenchimomi, tumor i linfatici, morbo di Hodgkin, mesoteliomi, neurilemomi maligni, ganglioneuromi, cordomi, feocromocitomi, tumori cistici, teratomi, carcinomi, xantogranulomi ed ematomi peritoneali. In una tabella sono presentati dettagliatamente i 192 casi. Secondo l'opinione dell'Autore lo spazio retroperitoneale, clinícamente asintomatico, e un luogo ideale per lo sviluppo dei tumori. Per tal ragione i tumori retroperitoneali possono, e spesso lo fanno, raggiungere dimensioni enormi senza dare alcun segno manifesto.

RÉSUMÈ

L'auteur rapporte 192 cas de tumeurs rétro-péritonéales avec commentaires anatomiques, pathologiques, étiologiques, diagnostiques. La liste des tumeurs est variée.

SUMARIO

Uma exaustiva revisão e analise estatistica de 192 tumôres primarios retroperitoniais é apresentada pelo autôr. Após um estudo conciso sôbre a anatomia, patologia, etiologia, diagnostico, aspéto radiologico, o autôr se demora na analise de cada tipo dos tumôres primarios do retroperitôneo. A sua relação inclue fibrômas, fibro-sarcômas, lipômas, liposarcômas, leiomiômas, leio-mio-sarcômas, hemangiopericitômas, mesenquimonas, tumôres linfoides, doenças de Hodgkins, mesoteliômas, neurilemonas, malignos, ganglioneurômas, cordômas, feocromocitômas, tumôres cisticos, teratômas, carcinômas, xantogranulômas e hematômas retro-peritoneais. São apresentados em quadros, vários detalhes sôbre os 192 casos registrados.

Segundo o autôr, "clinicamente silencioso" é o retro-preitôneo um local ideal para o desencolvimento de tumôres celulares. Podem, todavia, tais tumôres, atingir dimensões avantajadas sem causar quaisquer sintômas de significação.

ZUSAMMENFASSUNG

Es wird ein erschöpfendes Studium und eine statistische Auswertung von 192 primären retroperitonealen Geschwülsten vorgelegt. Nach einer kurzen Erörterung der anatomischen, pathologischen, aetiologischen, diagnostischen und röntgenologischen Grundlagen des Gegenstandes geht der Verfasser auf die einzelnen Formen der primären retroperitonealen Geschwülste ein. Sein Material umfasst Fibrome, Fibrosarkome, Lipome, Liposarkome, Leiomyome, Leiomyosarkome, Haemangioperizytome, Mesenchymone, lymphoide Geschwülste, Hodgkinsche Erkrankung, Mesotheliome, bösartige Neurilemome, Ganglioneurome, Chordome, Phaeochromozytome, zystische Geschwülste, Teratome, Karzinome, Xanthogranulome und retroperitoneale Haematome. Die Einzelheiten der 192 Fälle sind in Tabellenform dargestellt.

Nach Ansicht des Verfassers ist der "klinisch stumme" retroperitoneale Raum ein ideales Gebiet für ein uneingeschränktes Wachstum von Geschwulstzellen. Daher kommt es, dass die retroperitonealen Geschwülste häufig zu enormer Grösse anwachsen, ohne bedeutende Symptome hervorzurufen.

REFERENCES

1. Snyder, W. H., Jr.; Kruse, C. A.; Greaney, E. M., and Chaffin, L.: Retroperitoneal Tumors in Infants and Children. Report of 88 Cases, Arch. Surg. 63:26, 1951.

2. (a) Stromme, W. B., and Stander, H. J.: Retroperitoneal Tumors Simulating Genital Tract Neoplasms, Am. J. Obs. and Gynec. 52:456, 1946. (b) Herman, L.: Lateral Non-renal Retroperitoneal Neoplasms: Report of Two Cases, Cortical Carcinoma of the Adrenal Gland, Perineuroblastoma, J. Urol. 50:550, 1943. (c) Hoch, G. F.:

Retroperitoneal Tumors, J. Urol. 51:128, 1944. (d) Newman, H. R., and Pinck, B. D.: Primary Retroperitoneal Tumors, Arch. Surg. 60:879-896, 1950. (e) Donnelly, B. A.: Primary Retroperitoneal Tumors, Surg., Gynec. & Obst. 83:705-717, 1946.

3. Sweetser, T. H.: The Surgical Approach to Renal and Other Retroperitoneal Tumors, J. Urol. 57:651, 1947. Sheinmel, A., and Mednick, E. A.: The Roentgen Diagnosis of Upper Abdominal Retroperitoneal Space Occupying Lesions, Am. J. Roent. and Rad. Therapy 65:77-92, 1951.

4. Jackman, R. J.; Lemon, Clark P., and Smith, N. D.: Retrorectal Tumors, J.A.M.A. 145:956, 1951. Weyrauch, H. Jr.: The Significance of Renal Torsion in the Diagnosis of Retroperitoneal Tumors: Use of the Lateral Pyelogram, J. Urol. 41:877, 1939.

5. Schulte, T. L., and Emmett, J. L.: Urography in the Differential Diagnosis of Retroperitoneal Tumors, J. Urol. 42:215, 1939.

6. Sweetser, T. H.: Retroperitoneal Tumors Influencing Kidneys and Ureters, J. Urol. 47:619, 1942. Greene, L. F.: Extreme Renal Displacement due to Retroperitoneal Tumor, J. Urol 59:174, 1948. Emmett and Schulte[5].

7. Duff, J., and Kenyon, H. R.: Retroperitoneal Pneumography with Pyelography, New York State J. Med. 52:1790, 1952.

8. (a) Papin, F., and Mahon, R.: Volumineux Fibrome Retroperitoneal, Bull. Soc. d'Obst et de Gynec. 19:352, 1930. (b) Kretschmer, H. L., and Pierson, L. E.: Fibrolipomatosis of the Kidney: Report of a Case, Illinois M. J. 61:336-341, 1932. (c) Howard, H. H., and Suby, H. I.: Perirenal Fibrosarcoma, J. Urol. 40:4, 491, 1938. (d) McNamara, W. D.; Smith, H. D., and Boswell, C. S.: Retroperitoneal Fibrosarcoma: Report of 8 Cases, Am. J. Cancer 38:63-72, 1940. (e) Fernandez, F. L., and Sanchez, R. P.: Retroperitoneal Fibroblastic Sarcoma, Arch. Cubanos Cancerol. 2:206-210, 1943. (f) Hanley, H. G.: Perirenal Tumors, with a Report of a Further Case of Perirenal Fibrosarcoma, Brit. J. Surg. 35:406-410, 1948. (g) Case Records of the Massachusetts General Hospital, Case 34311: The Retroperitoneal Fibrosarcoma, New England J. Med. 239:203, 1948.

9. Stout, A. P.: Human Cancer. Philadelphia: Lea and Febiger, 1932.

10. Pack, G. T., and Tabah, E. J.: Primary Retroperitoneal Tumors. Read at the 34th annual meeting of the American Radium Society, Chicago, June 9, 1952.

11. Stout, A. P.: Fibrosarcoma, the Malignant Tumor of Fibroblasts, Cancer 1:30-63, 1948.

12. Dixon, C. F., and Valdheim, J. L.: Recurring Retroperitoneal Fibromyxosarcoma, Minnesota Med. 27:203, 1944.

13. Willis, R. A.: Pathology of Tumors. St. Louis: C. V. Mosby Company, 1948.

14. Stout, A. P.: Liposarcoma—The Malignant Tumor of Lipoblasts, Ann. Surg. 119:86, 1944.

15. Farbman, A. A.: Retroperitoneal Fatty Tumors and Review of the Literature from 1937-1947, Arch. Surg. 60:343-362, 1950.

16. Colvin, S. H. Jr.: Certain Capsular and Subcapsular Mixed Tumors of the Kidney Herein called "Capsuloma," J. Urol. 48:585-600, 1942.

17. (a) Von Wahlendorf, L.: Ueber Retroperitoneale Lipoma, Arch. f. klin. Chir. 115:751-768, 1921. (b) Masson, J. C., N. Amer. and Horgan, E. J.: Retroperitoneal Lipomas, Surg. Clin. North America 1:1451, 1921.

18. Mayo, C. H., and Dixon, C. F.: Retroperitoneal Lipoma, Minnesota Med. 10:272, 1927.

19. Delamater, J.: Mammoth Tumor, Cleveland M. Gaz. 1:31, 1859.

20. Hirsch, E. F., and Wells, H. G.: Retroperitoneal Liposarcoma: Report of an Unusually Large Specimen with Chemical Analysis, Am. J. Med. Sci. 159:356, 1920.

21. (a) Crabtree, E. G.: Perirenal Lipoma with Generalized Abdominal Lipomatosis, J. Urol. 23: 543, 1930. (b) Kutzmann, A. A.: Replacement Lipomatosis of the Kidney, Surg. Gynec. & Obst. 52:690, 1931. (c) Peacock, A. H., and Balle, A.: Renal Lipomatosis, Ann. Surg. 103:394-401, 1936. (d) Cattell, R. B., and Warren, K. W.: Retroperitoneal Lipoma, S. Clin. North America 27:659, 1947. (e) Simril, W. A., and Rose, D. K.: Replacement Lipomatosis and the Simulation of Renal Tumors, J. Urol. 63:588, 1950.

22. Seids, J. V., and McGinnis, R. S.: Malignant Tumors of Fatty Tissue, Surg., Gynec. & Obst. 44: 232, 1927. LeFur, R.: Des Tumeurs Pararenales, Bull. et Mem. Soc. de Chir. de Park. 22:484-496, 1930. Ockuly, E. A., and Douglas, F. M.: Retroperitoneal Perirenal Lipomata, J. Urol. 37:619, 1937. Kretschmer, H. L.: Retroperitoneal Liposarcoma in a Child, J. Urol. 43:61, 1940. Windholz, E.: Roentgen Diagnosis of Retroperitoneal Lipoma, Am. J. Roentgenol. 56:594, 1946. Ford, J. L., and Hittner, V. J.: Retroperitoneal Lipomata, Wisconsin M. J. 49:915-917, 1950.

23. Campbell, M.: Clinical Pediatric Urology, Philadelphia: W. B. Saunders Company, 1952.

24. Morgan, E. K., and Stone, C. M.: Primary Retroperitoneal Leiomyosarcoma, J. Urol. 39:63, 1938.

25. Fisher, E. R.; Kaufman, N., and Mason, E. J.: Hemangiopericytoma. Histology and Tissue Culture Studies, Am. J. Path. 28:655, 1952.

26. Stout, A. P., and Murray, M.: Hemangiopericytoma, Ann. Surg. 116:26, 1942.

27. Marazzini, A.: Angiosarcoma pararenale, Urologia 16:482, 1949.

28. Ward, G. E., and Stewart, E. H.: Retroperitoneal Cavernous Hemangioma, Am. J. Surg. 80:470, 1950.

29. Gilmour, J. R.: A Recurrent Tumor of Mesenchyme in an Adult, J. Path. & Bact. 55:495, 1943.

30. Stout, A. P.: Mesenchymoma, the Mixed Tumor of Mesenchymal Derivatives, Ann. Surg. 127:278, 1948.

31. Ravich, A.: Angiofibrolipoma of Kidney, Am. J. Surg. 8:110-113, 1930. Laplante, A.: Un Cas de Myxoliposarcome de la Loge Graissaise du Rein, Union Med. Canada 79:924, 1948.

32. Bowen, J. A.: Mesenchymoma: Secondary Involvement of the Urinary Bladder, J. Urol. 64: 31, 1950.

33. Chute, R.: Malignant Lymphoma and the Urinary Tract, J.A.M.A. 97:966-971, 1931. Mathe, C. P.: Retroperitoneal Lymphoblastoma Simulating Renal Neoplasm: Report of Case, J. Urol. 17:357-366, 1927. Watson, E. N.; Sauer, H. R., and Sadugor, M. G.: Lymphoblastomas in the G. U. Tract, J. Urol. 61:176, 1949.

34. Craver, L. F.: Lymphomas and Leukemia, J.A.M.A. 136:244-249, 1948.

35. Maximov, and Bloom: Textbook of Histolo-

gy. Philadelphia: W. B. Saunders Company, 1900.
Hoch, G. F.: Retroperitoneal Tumors, J. Urol. 51: 128, 1944. Glasser, S. T.; Moran, C., and Capute, A. J.: Lumbar Retroperitoneal Ganglioneuroma, New York State J. Med. 50:717, 1950.

36. Ortega, P. Jr.: Malignant Paraganglioma Arising from Organ of Zuckerkandl, Arch. Path. 53:78-86, 1952.

37. Hansmann, G. W., and Budd, J. W.: Massive Unattached Retroperitoneal Tumors, J.A.M.A. 98: 5, 1932.

38. Lloyd, F. A., and Bonnett, D.: Mullerian Duct Cysts, J. Urol. 64:777, 1950.

39. Landes, R. R., and Ransom, C. L.: Mullerian Duct Cysts, J. Urol. 61:1089, 1949.

40. Nichols, H. N.: Retroperitoneal Cysts, Ann. Surg. 126:340-349, 1947.

41. Nordland, M., and Nordland, M. A.: Retroperitoneal Cysts and Tumors, J. Internat. Col. Surg. 16:6, 1951.

42. Scholl, A. J.: Peripelvic Lymphatic Cysts of the Kidney, J.A.M.A. 136:4-7, 1948.

43. Herbut, R. A.: Urological Pathology. Philadelphia: Lea and Febiger, 1952.

44. (a) Campbell, M.: Pararenal Teratoma in an Infant, J. Urol. 29:677, 1933. (b) Anlyan, A. J., and Harper, P. V.: Retroperitoneal Teratoma, Am. J. Surg. 80:961-964, 1950. (c) Mecray, P. M. Jr., and Frazier, W. D.: Retroperitoneal Teratoma, Arch. Surg. 35:358-367, 1937. (d) Baker, W. J., and Ragins, A. B.: Pararenal Teratoma; Case Report, J. Urol. 63:982, 1950.

45. Gale, C. W., and Willis, R. A.: A Retroperitoneal Digit-Containing Teratoma, J. Path. Bact. 56:403, 1944.

46. Melicow, M. M.: Xanthic Lesions: Report of Four Cases, Including Two of Xanthomatosis of Kidney, J.A.M.A. 105:768, 1935.

47. Oberling, C.: Retroperitoneal Xanthogranuloma, Am. J. Cancer 23:3, 1935. Melicow, M. M.: Classification of Renal Neoplasms, J. Urol. 51:333, 1944. Melicow[46].

48. Golden, T., and Stout, A. P.: Smooth Muscle Tumors of the G. I. Tract and Retroperitoneal Tissue, Surg., Gynec. & Obst. 73:784, 1941.

LA PRESSE MEDICALE

La Grand Journal Français de Chirurgie et de Medicine parait chaque semaine, et donne toutes les informations scientifiques et professionelles

ABONNEMENT

$11.00 par an.

Priére d'envoyer directement le montant de l'abonnement à:

LA PRESSE MEDICALE, Masson et Cie, éditeurs

120 Boulevard St. Germain Paris VI, France

Schwannoma of the Pharynx

Report of a Case and Review of the Literature

PAUL GUGGENHEIM, M.D.
TOPEKA, KANSAS

SCHWANNOMA of the pharynx, a rare disease, has been described in twelve American articles since 1933, the first being that of Figi.[1] The majority of authors had experience of a single case. According to the most recent, Kennon[2] in 1950, only 15 instances have been reported. The present unusual case led to a review of all available literature, both domestic and foreign, which revealed a considerably larger number (34),* and also a variety of opinions about management. Operative data were available in only 26 cases. In 18 of these the patients were operated upon by the intraoral route, 4 with preliminary ligation or control of the external carotid artery. Eight were approached by the external cervical route. The tumor in the case here reported is believed to be the largest ever described, and the first to require a combined cervical-intraoral operation.

REPORT OF CASE

History.—Mrs. H. F., 30 years of age, took one of her 3 children to see the family physician on May 27, 1951, because of a dog bite of the hand. The physician, not having seen Mrs. F. for several years, noted a mushy, indistinct quality in her speech and, on inquiry, learned that she had felt something growing in her throat for the preceding four or five months. She complained of some difficulty in eating popcorn because of its "sticking in her throat," but denied having had any dysphagia otherwise.

Clinical examination revealed Mrs. F. to be well developed and well nourished. There was a visible and palpable fulness in the left submaxillary triangle, most prominent behind the angle of the jaw and extending backward to the mastoid tip and downward beneath the upper third of the sternocleidomastoid muscle. When the mouth was opened, an enormous retropharyngeal mass was seen (seemingly the size of a tennis ball), arising on the left side but extending far across the midline, pushing the tongue, the soft palate and the left tonsil fossa toward (Figs. 1 and 2*A*). A passageway remained on the right side of the pharynx, not larger than the diameter of one's little finger (1.5 cm.). The mass was firm and rubbery and did not pulsate. It extended superiorly to the vault of the nasopharynx, where it was broadly attached, the mucosa being reflected continuously from tumor to vault. The choanae were not obstructed. The nasopharyngoscope disclosed a smooth, nonulcerated anterior aspect of the nasopharyngeal portion of the tumor. The mass extended inferiorly below the tip of the epiglottis and was seen to rotate and displace the larynx toward the right. Both vocal cords moved well. The tonsils were absent. The teeth were in good repair. The ears were normal. Anterior rhinoscopic study gave negative results. On transillumination, the frontal sinuses were clear but the antra were dim. The thyroid gland was of normal size and consistency. There were no enlarged lymph nodes. On the left lower lateral aspect of the neck were a couple of irregular healed incisional scars from drainage of an abscess of some sort when the patient was 2 years of age. The remainder of the physical examination revealed nothing abnormal. Roentgenograms of the sinuses, the petrous ridges, the cervical part of the spine and the chest also gave negative results. A lateral film of the head and

*Two additional cases have been reported since this paper was written. In both the patients were operated on by the intra-oral route. Neither of the cases presented any new features (see Page 464).

From the Department of Otolaryngology, Creighton University, Council Bluffs, Iowa.
Submitted for Publication Oct. 20, 1952.

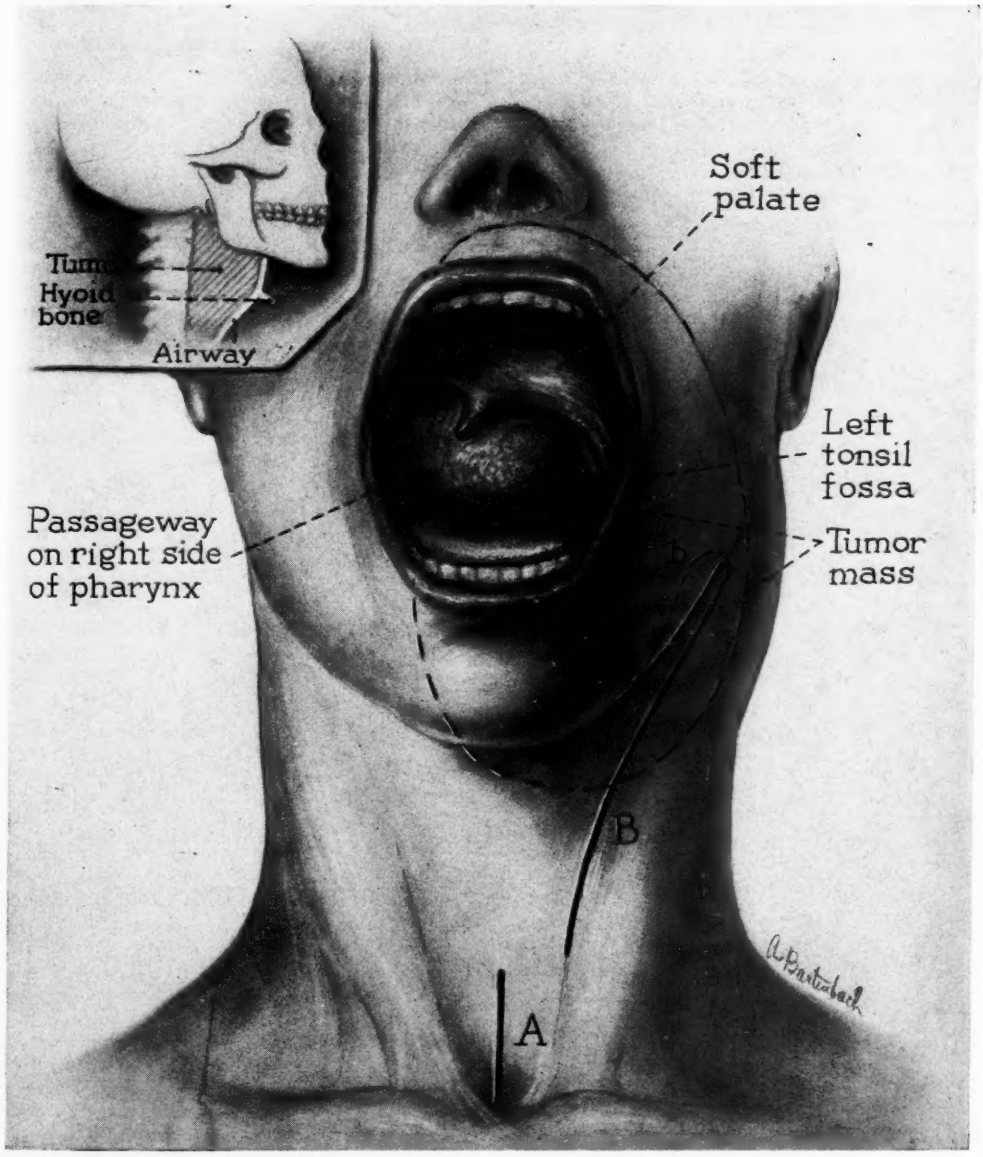


Fig. 1.—Tumor in situ. Extent of mass indicated approximately by dotted line. Heavy solid line indicates incision. After removal of mass, the submandibular portion of the neck incision migrated several centimeters cephalad to lie over the lateral aspect of the mandible. *Inset*, drawing from roentgenogram of head and neck, showing enormous retropharyngeal mass displacing air column far forward. Note loss of cervical lordosis.

neck showed the huge soft-tissue shadow of the tumor (Fig. 1, inset).

In the differential diagnosis the following possibilities were considered: (1) neurofibroma; (2) branchial cleft tumor with possible carcinomatous changes; (3) fibroma; (4) sarcoma; (5) carcinoma arising from the nose, sinuses or nasopharynx; (6) chordoma;

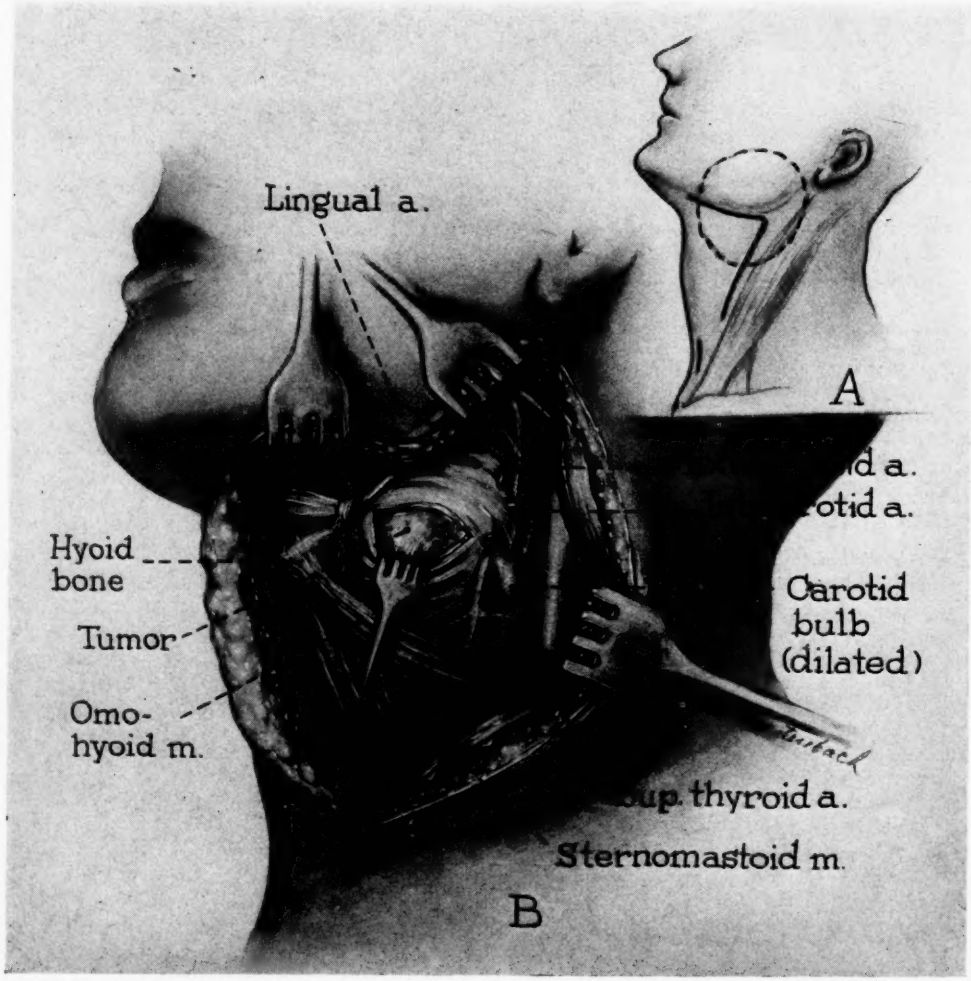


Fig. 2.—*A*, lateral view of tumor *in situ*. *B*, exposure of mass through neck wound.

(7) chondroma; (8) carotid body tumor; (9) mixed salivary gland tumor; (10) lipoma; (11) cold abscess, and (12) thombosed carotid aneurysm.

Early Management.—On May 31, 1951, the patient was admitted to Mercy Hospital, Council Bluffs, Iowa, where an aspiration biopsy was attempted. Two cc. of straw-colored fluid was withdrawn; the mass remained unchanged in size and consistency. An attempt was then made to excise part of the wall of the tumor with a punch forceps, after incision of the mucous membrane. Bleeding was controlled by pressure with a tannic acid-epinephrine tampon and electrocautery. The specimen was later reported to show only chronic inflammatory changes and no evidence of neoplasia. On June 1 the biopsy site was seen to be covered with yellow exudate. The patient was discharged from the hospital.

On June 3 the patient's husband called to report that she had had a bad night, having

to sit up in order to breathe. She was readmitted to the hospital, appearing pale and frightened, though not dyspneic. The tumor was observed to have descended farther into the hypopharynx, where it pressed harder upon the larynx. An elective tracheotomy, having been contemplated as the first step in the definitive surgical management, was now performed through a low vertical incision. Penicillin, 400,000 units, was given intramuscularly at once and daily thereafter.

On June 8 an examination was conducted, the patient being under anesthesia with intravenous pentothal sodium. With the Andy Love soft palate retractor, adequate access was gained to the nasopharyngeal part of the tumor, which attached to the posterior aspect of the vault, sparing the left torus and choana. The hypopharyngeal portion of the mass was exposed adequately by a tongue depressor. No carotid pulsations were felt anywhere in the pharynx or in the neck above the inferior border of the tumor. It was therefore concluded that the great vessels were in intimate association with the tumor. For this reason an external cervical approach was deemed the only feasible one.

Operation.—On June 11, at 11:15 a.m., the patient was anesthetized with pentothal-nitrous oxide. The tracheotomy tube was removed and an endotracheal tube introduced through the tracheostome. A submandibular incision on the left was made back to the angle of the jaw, curving gently around to continue downward along the anterior border of the sternocleidomastoid muscle, thus outlining a flap which was raised and dissected anteriorly (Figs. 2*B* and inset). The sternomastoid muscle was identified, freed and retracted laterally and posteriorly. The internal jugular vein, the common carotid and the internal and external carotid arteries and facial vein system were identified. The wound was flooded with 1 per cent procaine hydrochloride to diminish vagal reflexes, after which the external carotid artery was doubly ligated and divided distal to the origin of the superior thyroid artery. The lingual artery was separately ligated and divided from the distal portion of the external carotid in order to give better exposure. The submandibular branch of the facial nerve was identified beneath the angle of the jaw and retracted superiorly in order to avoid injury. The digastric muscle and the hypoglossal nerve were identified and similarly retracted upward. The anterior and posterior facial veins were ligated and divided. The tail of the parotid gland was identified and retracted upward and the infraparotid node excised. The bulge of the bottom of the tumor was identified deep to the carotid vessels. A thin muscular covering over the tumor was divided and the capsule brought directly into view. On exploration, the tumor was observed to extend along the floor of the mouth deep to the submaxillary salivary gland, quite far anteriorly. After division of the hyoglossus muscle and retraction of the hyoid bone outward and downward, the main tumor mass was freed by means of blunt dissection from its attachments in the submaxillary space. Posteriorly, the tumor was bluntly dissected from the internal carotid artery by means of a mosquito hemostat under illumination provided by a Cameron electric headlight, the dissection extending superiorly along the entire extracranial course of the artery up to the entrance to the carotid canal. The sympathetic chain was seen to disappear into the inferior end of the tumor. By sharp dissection with scissors, it was demonstrated that the tumor itself arose from the superior cervical sympathetic ganglion (Fig. 3). The index finger was then introduced into the retropharyngeal space and

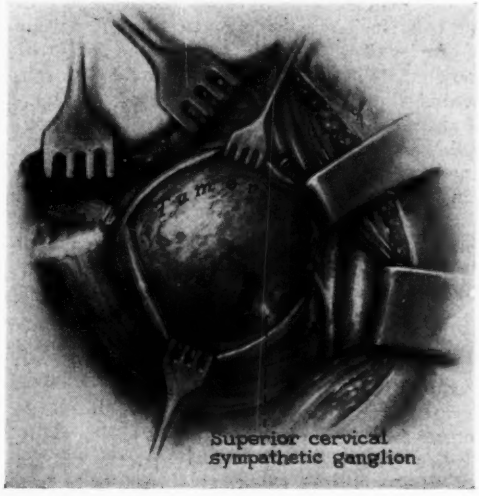


Fig. 3.—Another view of exposure, showing location of cervical sympathetic ganglion. This ganglion, from which the tumor arose, was excised, together with approximately 2 cm. of sympathetic chain.

the superior part of the tumor bluntly dissected as free as possible. The tumor was then delivered through the neck wound, and the ganglion, with approximately 2 cm. of sympathetic chain, was excised. A small Penrose drain was inserted into the retropharyngeal space and brought out through the middle of the vertical arm of the neck incision. The wound was closed in layers. The patient was then rolled straight upon her back. With illumination from the electric headlight, the entire pharynx was examined with a Love retractor and a tongue depressor. At first it appeared relatively flat in contrast with its former state, but as it was observed an increasing bulge developed, evidently from a hemorrhage into the retropharyngeal tissues. The dime-sized hole at the site of biopsy was enlarged by incising the mucous membrane both superiorly into the vault of the nasopharynx and inferiorly almost down to the larynx. A globular tumor mass in this cavity, measuring approximately 3.5 to 4 cm. in diameter, was seized with Babcock forceps and freed as much as possible by semiblunt dissection with the Hurd dissector. It appeared to be broadly attached to the prevertebral muscles and poorly encapsulated. A cautery scalpel was used to sever its broad base. The tumor bed was carefully inspected and all bleeding points cauterized with the suction cautery. The end of the Penrose drain, which had been left in the neck incision, was seen at the left border of the cavity. (The tumor was evidently of the dumbbell variety, extending from the neck, behind the angle of the jaw, into the retropharyngeal space. The handle of the dumbbell had undoubtedly been divided by the finger dissection through the neck.) The margins of the former biopsy wound, macerated and friable, were resected. The rent in the pharyngeal mucosa was closed by means of interrupted chromic sutures, two of which included bites in prevertebral muscle in order to eliminate dead space. At the termination of the procedure, the pharynx and endotracheal tube were suctioned and the tube removed. A bronchoscopic toilet was then preformed, with recovery of considerable bloody mucus from the trachea and both bronchi. A Levine tube was inserted. When the patient left the operating room after anesthesia lasting seven and a half hours, she was quite dry and beginning to regain consciousness.

Postoperative Course.—Pain was slight, controlled by an occasional tablet of acetylsalicylic acid. There was a moderate serosanguinous discharge from the neck wound. A complete Horner's syndrome occurred at once. On ambulation there were several episodes of marked sinus tachycardia, doubtless due to a surgically created autonomic upset. The Levine tube was removed on June 16. The drain, after gradual shortening, was removed on June 18. On June 20, right otitis media simplex developed despite daily penicillin, but subsided promptly with neosynephrin nasal drops. The patient was discharged from the hospital on June 21, with the tracheotomy tube still *in situ*. She was decannulated on June 28. Slides were reviewed by Dr. Hayes Martin of Memorial Hospital, New York, who confirmed the diagnosis of schwannoma and advised against postoperative roentgen therapy.

Before the operation the patient had had difficulty only in eating popcorn. Postoperatively she encountered some degree of trouble in eating or drinking anything, having to proceed slowly and cautiously. Frothy saliva tended to collect in the pyriform sinuses which she could neither completely swallow nor expel, but this caused little difficulty. She began gradually to feel some pain in the left jaw on chewing, and after six months a slight adductor weakness of the left vocal cord developed. Almost a year later (May 17, 1952), the left adductor weakness had disappeared entirely. The jaw pain was noticeable, but slight, on rare occasions when she was "nervous with the children." At the time of this report, saliva collects only in the left pyriform sinus, and the soft palate has shown progressively less tendency to move to the right when the patient says "ah." These sequelae are undoubtedly due to temporary surgical denervation of the pharynx plus late contracture of scar tissue. In an unintelligent patient, or even an uninformed intelligent one, they could easily lead to reproaches against the surgeon for having aggravated the original complaint. Fortunately, this patient was both intelligent and well informed.

During the last week of October 1952, the patient was seen for a routine periodic checkup. A small mass was observed in the vault of the nasopharynx, measuring approximately 2 by 1.5 by 0.8 cm. This had the appearance of typical adenoid tissue, but its removal was advised because of the possibility of recurrence of the tumor. With the region under local anesthesia, the vault of the nasopharynx

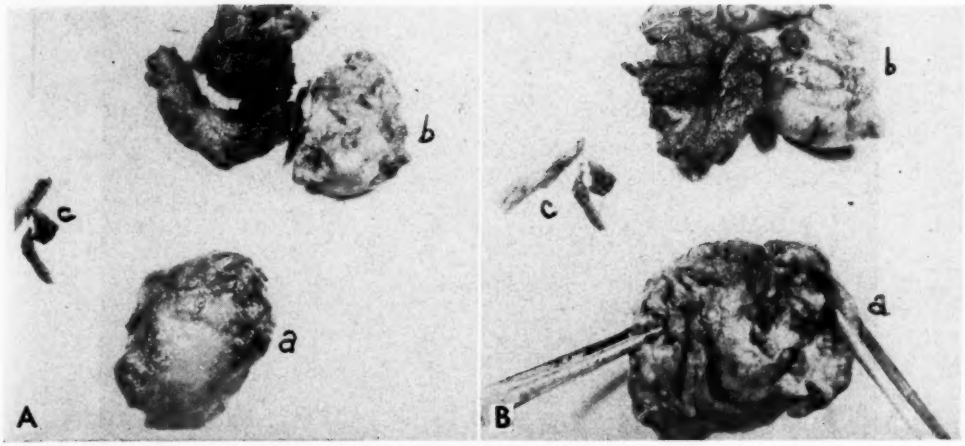


Fig. 4.—*A*, Gross specimen, showing (*a*) apparently intact ovoid tumor mass removed through neck; (*b*) retropharyngeal portion of tumor removed perorally, and (*c*) superior cervical sympathetic ganglion and pieces of sympathetic chain, dissected free from mass (*a*). Dimensions reduced by approximately one-half. *B*, main mass cut open (*a*), showing variegated appearance due to necrosis, cystic degeneration, melanotic deposits, etc. Sections *b* and *c* have been turned over.

was directly exposed by means of the Andy Love palate retractor, and the mass removed with one bite of the largest LaForce adenotome. A most vigorous hemorrhage ensued, which required for control several transfixion sutures across the vault. The specimen was reported by the pathologist to show only adenoid tissue, with no evidence of schwannoma. The patient made an uneventful recovery from this procedure.

Pathologic History. — Schwannoma, or neuofibroma, was first established as a pathologic entity by Verocay[3] in 1910. The first 2 cases of pharyngeal schwannoma (q.v., p 457: Heinatz 1906; Littauer, 1907) were reported prior to this. As was mentioned by Fantuzzi,[4] in his comprehensive 1946 article, Nathanson[5] established the true diagnosis in these cases retrospectively from photomicrographs almost a generation later. In contrast to the now well recognized morphologic features of this tumor, there has long been a controversy in regard to its pathogenesis. Is the tumor derived from ectodermal Schwann cells or mesodermal fibroblasts? Murray, Stout and Bradley,[6] in some beautiful tissue culture experiments, have convinced themselves that the Schwannian theory is the correct one. The present case serves as a fairly typical example of the pathologic picture of schwannoma.

Pathologic Picture.—Specimen 1 (mass removed externally is shown in *a*, Fig. 4*A* and Fig. 4*B*). Grossly the mass was ovoid measuring 7.1 by 6.0 by 3.6 cm., and having a pink, fibrous capsule. On section the contents were reddish yellow to reddish brown, soft and friable, with areas of cystic degeneration varying up to 1.5 cm. in diameter. Microscopically (Fig. 5): the tissue was cellular, the cells having a granular, indistinct cytoplasm with elongated, deeply staining nuclei, often forming whorls and palisades. This pattern (Antoni Type A tissue) occupies most of the low power photomicrograph (Fig. 5*A*). In the upper part of this photomicrograph there is a lighter staining area, without whorls or palisading, but with edematous intercellular tissue spaces (Antoni Type B tissue). A high power view of the former is seen in Figure 5*B*. In places, large hemorrhagic areas and thrombosed vessels are seen. There were other more, fibrous areas (not well shown), containing nests of cells

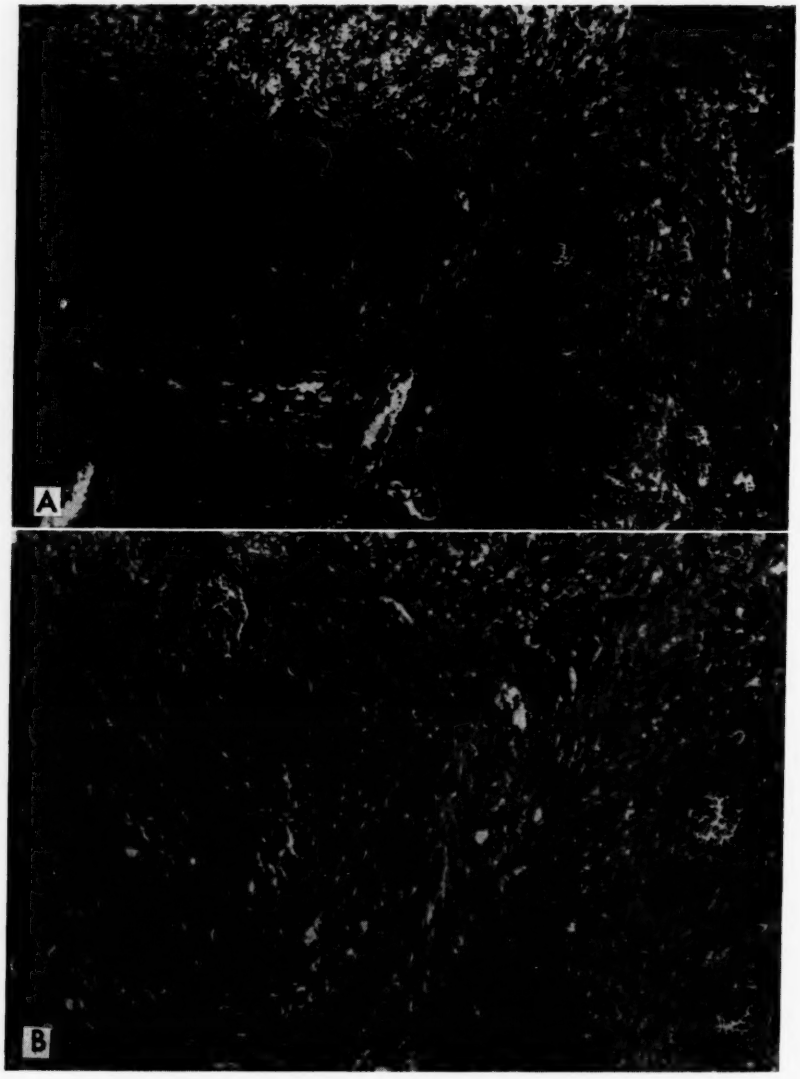


Fig. 5.—*A*, low power view of mass (a, Figs. 3*A* and 3*B*) removed externally. Darker areas, Antoni Type A tissue; lighter areas near top, Antoni Type B tissue. *B*, high power view of Antoni Type A tissue, showing whorls and palisading.

blocked by melanotic pigment deposits. The pathologic diagnosis was neurofibroma.

Specimen 2 (mass removed transorally is shown in *b*, Figs. 4*A* and 4*B*). Grossly this mass of tissue measured 4.5 by 3.0 by 1.8 cm. It was not encapsulated. It was fleshy and rubbery on cross section, without cystic cavities and seemingly containing muscle tissue.

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
1. Heinatz, 1906 (cited by Fantuzzi,[4] original reference unavailable*)	F., 19	Alteration of voice, dysphagia, dyspnea	10 yrs.	Retropharyngeal, midline	8 × 7 cm.	Tracheotomy; Peroral excision	
2. Littauer, 1907 (cited by Fantuzzi[4])	M., 34	Dysphagia, dyspnea, hoarseness, swelling at angle of jaw, Horner's syndrome	4 yrs.	Retropharyngeal, left-sided	9 × 6, 5 × 5 cm.		Paralysis of left soft palate and left vocal cord
3. Askanazy[7], 1914	F., 53	No clinical details given		"Very large tumor in right side of throat"	"3 pieces of chestnut size, 4 of hazelnut size"	Operation, 1909, by Prof. Girard; peroral morcellation	
4. Freifeld, 1914-1916. (cited by Fantuzzi[4])	M., 32			Tumor in right retropharyngeal area	8 cm.		
5. Rosner, 1930 (cited by Fantuzzi[4])	M., 43	Disturbed deglutition and respiration			4 × 3 cm.	Described at autopsy	
6. Davidov,[5] 1931	F., 30	Pain in neck, unclear speech		Oval tumor, left posterior and lateral pharyngeal wall, nasopharynx to pyriform sinus; choana and torus free; slightly past midline in hypopharynx	6.4 × 4.2 × 3.4 cm. Left sympathetic	Operation by Prof. A. A. Skript. Incision along anterior border SCM. Blunt dissection. Ligation of facial veins. Difficulty with adhesions in posterior superior remote part of tumor	Paralysis of lower branches of left facial nerve, Horner's syndrome

*A reference was found under the name Geynatz: "Von der Retropharyngealen Geschvulsten," Russk. Chir. Arch. 1908, which was unobtainable.

UNIVERSITY OF MICHIGAN LIBRARIES

Cases of True Solitary Schwannoma of Pharynx (Continued)

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
7. Goldberg, 1931 (cited by Fantuzzi[4])	M., 49	Disturbed deglutition and phonation	15 yrs.	Large tumor, right side of throat, extending from eustachian orifice to right pyriform sinus, pushing palate forward	"Large"		
8. Terebinski, 1932 (cited by Fantuzzi[4])	F., 42	Slight hoarseness	5 yrs.	Right side	5.5 × 4 × 3.5 cm.		Right Horner's syndrome; right hypoglossal paralysis
9. Kouperman, 1932 (cited by Fantuzzi[4])	F., 31	Nasal voice, disturbed deglutition		Mass size of hen's egg in left side of throat	"Hen's egg sized"		
10. Figi,[1] 1933	F., 61	Frequent sore throat; persistent irritation of throat; left-sided nasal obstruction		Mass causing bulge in left side of neck and swelling of left tonsillar region extending almost to midline	4.5 × 6 × 8 cm.	Preliminary tonsillectomy; 4 weeks later, external carotid ligated and tumor removed intraorally. Projections in various directions — laterally, inferiorly. Capsule broke; curet used for extentions	
11. Natanson,[5] 1934	M., 24	Difficulty in deglutition and respiration	5 yrs.	Tumor occupying right half of throat to midline, from palate to pyriform sinus; lymphoma suspected	5.5 × 3 cm. with appendices 3 and 4 cm. "hen's egg" (After formol fixation)	5 roentgen treatments; "temporary resection of inferior maxilla" advised and refused; later per-oral removal	Horner's syndrome and paralysis of palate

Cases of True Solitary Schwannoma of Pharynx (Continued)

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
12. Natanson,[5] 1934	M., 26	Difficult deglutition and nasal respiration	11 yrs.	Tumor, right half of pharynx and nasopharynx arising from tonsillar region	"Hen's egg"	Roentgen and radium therapy; later intraoral excision after placing tape around external carotid	Right Horner's syndrome
13. Bruzzoni,[9] 1935	F., 32	Vasomotor changes in nose; disturbed deglutition, left otalgia		"Enormous mass in left mesopharynx"	"Mandarin" sized, i.e. tangerine	Rose position; local anesthesia; incision through pharyngeal membrane; operating surgeon, Prof. Serafini	
14. Friedman and Eisenberg,[10] 1935	F., 30	Painless swelling; right hemiatrohy of tongue	1½ yrs.	Swelling occupying whole superior carotid triangle, bulging pharynx and tonsil toward midline, extending as high as transverse process of C 2	5 × 3 cm., arose from hypoglossal nerve	External neck approach	
15. Hall and Owens,[11] 1941	M., 57	Dysphagia	8 mos.	Right peritonsillar swelling extending almost to midline and from "above uvula well into hypopharynx"	7 × 4.5 cm.	Preliminary tonsillectomy; biopsy; 2nd biopsy; ligation of external carotid and intraoral excision	Carcinoma-like granulations grew at site, of first biopsy revealed Schwannoma; denuded prevertebral muscle in bed of tumor
16. Motley,[12] 1941	M., 21	Increasing dysphagia, lump in throat	4 yrs.	"Hen's egg sized" mass behind left tonsillar pillar, from lower pole to pyriform sinus, slightly movable; tonsils absent	30.8 gm., 6 × 4.5 × 2.5 cm.	Intraoral excision (ether anesthesia); wound left open to granulate in; relatively bloodless; difficult separation from neck structures	

Cases of True Solitary Schwannoma of Pharynx (Continued)

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
17. Lingeman,[13] 1941	M., 27			"Duck egg sized" mass, left tonsil region, extending up behind palate and down below base of tongue	An average duck egg measures about 7.5 × 5 cm. (author)	Local tonsillectomy; bulging left fossa incised with cataract knife; later, intraoral removal in pieces by dissection and snare; iodoform packing	Scotomas of left eye; quivering of left eye; dilated left pupil; increase in size of mass (after first procedure)
18. Fantuzzi,[4] 1942	M., 25	Postnasal obstruction; heavy mucoid discharge; dry fauces; disturbance of smell and deglutition; nasal voice		"Hen's egg sized" mass extending in midline from base of skull to C 3	"Hen's egg"	Intraoral removal through vertical incision; difficulty separating tumor laterally and in nasopharynx	
19. Ehrlich and Martin,[14] 1943	F., 37	Pain on swallowing	1 yr.	4 cm.; retropharyngeal mass		Aspiration biopsy (previous roentgen treatment elsewhere)	No enlargement on 3 yr. follow-up; operation considered inadvisable
20. Ehrlich and Martin,[14] 1943	F., 59	Pain on swallowing	6 yrs.	4 cm.; retrotonsillar mass with marked pulsation over apex		Aspiration biopsy (previous roentgen treatment elsewhere)	No enlargement on 1 yr. follow-up; operation considered inadvisable
21. Hill,[15] 1944	F., 20	Fulness and obstruction of left side of throat; previously misdiagnosed as peritonsillar abscess		"Hen's egg sized" tumor in left tonsillar region, extending from base of tongue up to level of torus	6.4 cm.	Long vertical intraoral incision almost up to base of skull	Horner's syndrome, subsiding in 2 days; permanent paralysis of left vocal cord

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
22. Turchik,[16] 1946	F., 27	Paralyzed right vocal cord; mass at angle of right jaw; weakness of right shoulder; nasal speech; dysphagia	5 yrs.	Large mass occupying right tonsillar region, extending to uvula; tonsils out	7.0 × 4.5 × 3.0 cm., 57.0 Gm.; arose from vagus at base of skull	Incision of right anterior and posterior tonsillar pillars; blunt dissection; part of mass adherent to base of skull posteriorly — removed separately	Persistent Horner's syndrome from 3rd day; shoulder weakness disappeared; other symptoms persisted
23. Violé,[17] 1946	M., 20	Irritation of throat following measles; Horner's syndrome since 1940, known tumor since 1941	8 yrs.	Mass in tonsillar region, extending from level of palate to pyriform sinus and not beyond midline	7.5 × 5.8 × 4.0 cm.	Biopsy; intraoral excision	Horner's syndrome more marked but receded to former level
24. Koop, Jordan and Horn,[18] 1947	F., 49	Pain in left ear; mass in left side of neck, more recent mass in left tonsillar region	8 yrs.	Neck mass size of "half an orange"; tonsil mass, 3 cm.	7.0 × 5.0 × 2.0 cm.	Biopsy; intensive roentgen therapy later, lateral cervical approach; some tumor fragments left at biopsy site	After x-ray, otalgia aggravated to constant, severe; dysphagia developed; temporary paralysis of 9th & 10th nerves after operation
25. Koop, Jordan and Horn,[18] 1947	F., 30 (Negro)	Painful, difficult swallowing	14 mos.	Egg-sized mass behind left posterior tonsillar pillar, up into nasopharynx, down to epiglottis; indefinite prominence in left submaxillary region	4.5 × 3.0 × 2.5 cm.; arose from small unidentified nerve trunk; lay beneath constrictors	Biopsy unrevealing; Wassermann reaction positive; antisyphilitic treatment; Referred to general surgery for operation by external approach, one finger in pharynx, mucosal integrity maintained, blunt dissection	Mass grew rapidly, with obstruction to breathing and swallowing during antisyphilitic treatment Permanent Horner's Syndrome after operation

Cases of True Solitary Schwannoma of Pharynx (Continued)

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
26. Koop, Jordan and Horn,[18] 1947	F., 50 (Negro)	Difficult swallowing	Sev. mos.	3.5 cm. mass in right posterolateral oropharynx, extending down to "upper laryngopharynx"; unilateral tonsillar *atrophy*	5.5 × 4.0 × 2.5 cm.; ganglion cells at periphery suggested sympathetic origin	3 biopsies inadequate; preliminary tracheotomy; intraoral excision under pentothal; little bleeding	
27. Koop, Jordan and Horn,[18] 1947	M., 55	Dysphagia		"Hen's egg sized" mass behind right post-tonsillar pillar.	Not stated	Roentgen therapy elsewhere for unproved diagnosis of sarcoma, intraoral operation; large vessel ligated for hemorrhage (probably internal carotid)	Never recovered consciousness; died 24 hours later; cause of death said to be questionable
28. Koop, Jordan and Horn,[18] 1947	M., 20	Fulness of throat following recent U.R.I.; diagnosis, peritonsillar abscess		Right posterior pharyngeal mass extending into nasopharynx	Not stated	Tonsillectomy elsewhere; intraoral excision; much bleeding; cavity packed	Transient Horner's syndrome
29. Michl,[19] 1947	F., 34	Dysphagia; regurgitation, dyspnea; loss of weight	3 to 5 years	Hypopharyngeal mass	Left hypopharynx below tonsil; size of orange	Preliminary tracheotomy; lateral pharyngotomy	For a few weeks, pharyngocervical fistula, which closed; decannulated after 1 month; lived 8 yrs. without recurrence

Cases of True Solitary Schwannoma of Pharyn... (Continued)

No.	Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
30.	Slaughter and DePeyster,[20] 1949 New syndrome described: 1. Dysphagia 2. Pulsation of tumor due to medial displacement of internal carotid artery 3. Deficit of function of cranial nerve of origin	F., 65	Progressive dysphagia; throbbing throat; dyspnea when recumbent; patient hypertensive, B.P. 230/130; retinopathy	4 yrs.	Mass extending from vault of left nasopharynx to level of cricoid and medially to median raphe	Size not stated; connected to vagus	Elsewhere, unsuccessful attempt at external excision, radon seeds inserted; aspiration biopsy; external carotid ligation; intraoral excision piecemeal (difficult because of scarring); internal carotid medially displaced	Hemiplegia, cleared in 20 days; left vocal cord paralyzed
31.	Slaughter and DePeyster,[20] 1949	F., 68	Pain in left tonsil and occiput; dysphagia	3 mos.	Left lateral pharyngeal tumor encroaching on air-way, seen and felt in neck; pulsation medially	5.0 × 4.0 × 2.5 cm.; arose from hypoglossal nerve; extended from base of skull to carotid bulb	General anesthesia; submandibular incision; external carotid and various branches ligated	Vocal cord paralysis for 3 mos.; dysphagia cleared in 3 mos.
32.	Slaughter and DePeyster,[20] 1949	F., 60 (Negro)	Dysphagia; dyspnea; stridor—(emergency)	4 yrs. 1 mo.	Lemon-sized mass occupying ½ pharyngeal space, arising right tonsil fossa, extending deep into hypopharynx; pulsating artery posteromedially; right vocal cord paralyzed	7.0 × 3.0 × 2.5 cm. Vagus nerve	Bastianelli incision; tumor between external carotid artery and distorted, medially displaced internal carotid; vagus entered below; tumor in pterygoid space; external carotid and various branches ligated	Uneventful recovery

Cases of True Solitary Schwannoma of Pharynx (Continued)

No. Author and year	Age and Sex of Patient	Complaint	Duration	Description and Location of Tumor	Size and Origin of Tumor	Method of Treatment	Results
33. Slaughter and DePeyster,[20] 1949	F., 53	Hoarseness; dysphagia, pain in left side neck, face and head	7 yrs.	Lemon-sized mass in left tonsil fossa, extending somewhat across midline and down into hypopharynx; weak left vocal cord; edematous larynx; scars on left side of neck	5 × 3.5 × 1.5 cm.	Elsewhere, two previous incisions for drainage of abscess; modified Bastianelli incision; tumor from base of skull to larynx	Elsewhere further operation advised against because of pulsating vessel over tumor; dysphagia and pain improved; transient Horner's syndrome, laryngeal paralysis persisted
34. Kennon,[2] 1950	F., 25	Impaired speech; dysphagia; left tonsil enlarged since age 10	5 yrs.	Left tonsil displaced to midline by mass; no palpable pulsation; extended from level of base of tongue to transverse process of a "high cervical vertebra"	40 Gm.	Tonsillectomy; constrictor split; tumor enucleated but extended so far posteriorly it was removed in pieces with tonsil snare; cavity left open; little bleeding	Dysphagia persisted to date; soft palate paralyzed on side opposite tumor; liquids regurgitated; voice normal

Author's Note: Since this article was submitted for publication, 2 additional cases of schwannoma of the pharynx have been reported. The first is a case described by Lieutenant Colonel Kenneth Somers of the Fitzsimmons Army Hospital in Denver, Colorado (Ann. Otolaryngol. **61**:635, 1952). The patient was a man aged 20 with a history of left cervical adenopathy since 1943, previously diagnosed as tuberculosis of the lymph nodes. A biopsy revealed "fibrous tumor." In 1948 soreness of the throat developed, with left-sided swelling of the pharynx, painful swelling in the left side of the neck, dysphagia and fever. The diagnosis was retropharyngeal abscess. An attempt was made at aspiration but was unsuccessful. In a peroral operation the tumor was shelled out in five pieces, the largest measuring 3 by 2 by 1 cm. It was solid throughout, and its color was white to gray to yellowish brown. A second biopsy of the neck revealed only chronic adenitis.

The other case (Hanley, J. S., and Davol, R. T., Arch. Otolaryngol. **56**:207-208, 1952) was that of a 24-year-old woman with an asymtomatic swelling of the right posterior pharyngeal wall. The right side of the face had been fuller than the left for ten years. The tonsils and adenoids had been removed at the age of 2 years and the operation revised at the age of 5. The tumor was the size of a large bantam's egg, extending from the base of the torus to the level of the arytenoids. Preoperatively there was a mild Horner's syndrome, aggravated by intral-oral excision. The tumor measured 3.2 by 4.3 by 5.5 cm.

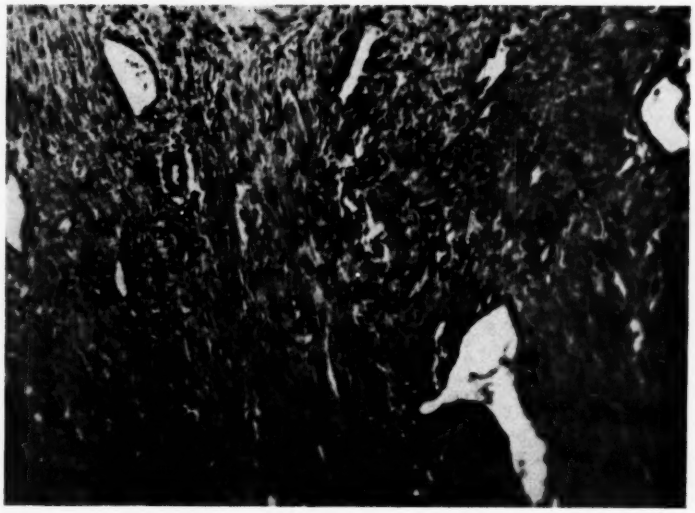


Fig. 6.—"Strangulated neurofibromatous tissue" from tumor (*b*, Figs. 1 and 2) removed perorally. Cellularity is less than that of main tumor mass (*a*, Figs. 3*A* and 3*B*), and diminishes gradually (right to left above) as one approaches normal prevertebral muscle (not shown). Note large (empty) blood vessels.

Microscopically (Fig. 6) the tissue was composed of edematous, highly vascular fibrous tissue. "Waviness" in places suggested a neurogenic origin. The vessels were highly distended, with frank hemorrhage in places. There was a gradual diminution in cellularity around the periphery until some apparently normal muscle was reached. (This transition is difficult to show in all stages on one photomicrograph, but in Figure 6 a diminution in cellularity is apparent, going from right to left.) The diagnosis was strangulated neurofibromatous tissue.

Specimen 3 (superior cervical sympathetic ganglion appears in *c*, Figs. 4*A* and 4*B*). Grossly it was a small, flat piece of tissue measuring 17 by 12 by 2.5 mm. Microscopically (Fig. 7) fibrous tissue was observed, containing one nest of ganglionic nuclei and scattered leukocytic infiltrates. The diagnosis was inflammatory reaction about ganglionic tissue.

Previously Reported Cases. — The accompanying table summarizes, in chronologic order, the previously reported cases of schwannoma of the pharynx, omitting instances of von Rechlinghausen's disease.

Excluded from this table, also, are cases of schwannoma of the neck without major pharyngeal involvement, in which oral, pharyngeal or laryngeal symptoms were caused by some degree of direct impingement or interference with innervation. From the point of view of pathogenesis, the omission of such cases is rather arbitrary. They have been reported mostly by general surgeons but will be encountered by any conscientious bibliographer of this subject. Sekiguchi and Oije[23] in 1926 reported a vagal schwannoma in a man aged 39. Stout[24] in his 1935 article mentioned sympathetic schwannomas of the neck, not elsewhere referred to, observed by Amano and Lebert, and one of spinal accessory origin reported by Cohen. He contributed a case of his own observation (Case 23) which probably should have been included in my table: that of a tumor 3 by 2 cm. in the nasopharynx, behind and attached to the right posterior tonsillar pillar. Cutler and Gross,[25] reporting in 1936 a large

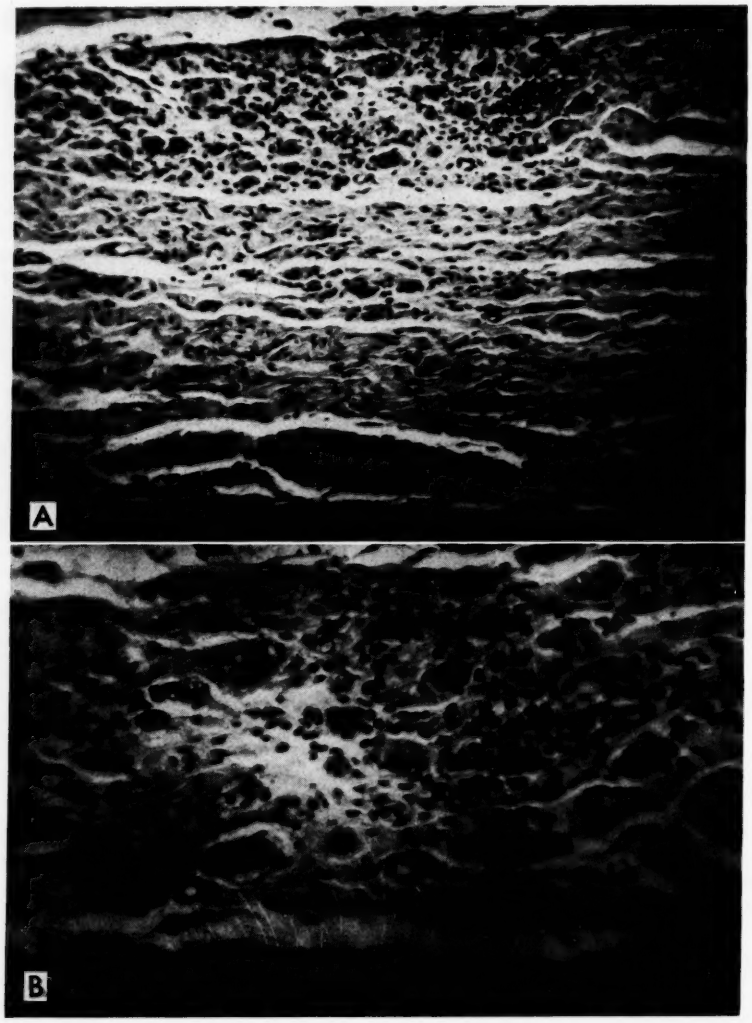


Fig. 7.—*A*, low power view of superior cervical sympathetic ganglion. Scattered ganglion cells imbedded in cellular fibrous tissue are seen in lower two-thirds of photomicrograph. In upper third, note nest of ganglion cells showing lymphocytic infiltration. *B*, high power view from upper third of A, showing nest of ganglionic cells, etc.

series of neurofibromas from their extensive general surgical experience, recorded 2 interesting cases of tumors arising from the vagus (Cases 12 and 16). In the latter there was a mass at the angle of the jaw in a woman 66 years old, extending inferiorly to the hyoid level and producin edema and a bulge in the left tonsilla fossa. Noteworthy was the lateral displace ment of the internal carotid artery (cf Slaughter and DePeyster[20]). Bustos[26] i 1945 reported a vagus tumor in the nec

of a girl aged 17. R. S. Murley[27] in 1948 reported a similar case and mentioned one of Mayo and Barber in 1934, not elsewhere referred to. Murley stated that "preservation of nerve function is a consistent feature of these tumors, whereas disturbance of nerve function, more rapid growth and infiltration of surrounding structures is characteristic of the much rarer malignant type of tumor" (cf. Slaughter and DePeyster[20]). Such a malignant tumor (neurofibrosarcoma), arising from the left vagus sheath, was reported in 1940 by Furrer and Fox.[28] In only 3 cases of schwannoma (see table, Cases 14, 22 and 23) other than those of Slaughter and DePeyster was a preoperative nerve deficit present.

Schwannoma of the larynx and laryngopharynx is excessively rare. One instance is quoted in the 1946 article by Fantuzzi[4] —that of Carrega (1926)—a walnut-sized mass of 20 years' duration in the left laryngeal vestibule of a man aged 32. In 1950 I observed a similar tumor measuring about 3 by 2.5 cm., filling the entire left pyriform sinus and bulging into the postcricoid region; the patient was a woman 57 years old. This patient, who suffered only slight dysphagia, submitted to biopsy but declined surgical removal of the tumor by lateral pharyngotomy.

Other neurogenic tumors of the pharynx are on record and present exactly the same clinical problem as does schwannoma. Foster[29] in 1942 reported a ganglion cell neuroma removed by the intraoral route. Fantuzzi[4] in his 1946 article, listed a similar tumor removed by Mertz in 1915 from the right retropharyngeal region of a girl aged 17, evidently a case of von Rechlinghausen's disease. This tumor, measuring 7 by 2, 5 by 2, and 3 by 2 cm., was illustrated *in situ* by a drawing in the comprehensive 1935 article of Natanson[5]. It is striking that, like the tumor in my case, it crossed the midline to occupy most of the retropharynx but did not cause the soft palate to bulge forward. New and Devine[30] in 1947 reviewed the experiences at the Mayo Clinic with neurogenic tumors of the nose and throat. Five pharyngeal tumors were observed in a 27-year period, including Figi's case of schwannoma (1933), the first to be reported in the United States. They mention, as problems in differential diagnosis, desmoid, lipoma and mixed salivary gland tumor.

Should Schwannomas of the Pharynx Be Treated? Ehrlich and Martin[14], of Memorial Hospital, stated in 1943: "When the tumor (schwannoma) is situated in a less accessible area, such as the pharynx, surgical removal in certain cases will be attended by definite risk, especially in older subjects. Under such circumstances, even though the patient prefers an operation, the prudent surgeon is justified in deferring indefinitely with the confidence that in any case, the progress of the growth is slow and malignant degeneration improbable."

On the other hand, Motley[12] in 1941 considered these tumors malignant by virtue of their position, relation to vital structures and growth propensity, although admittedly benign in a histologic sense. He considered removal imperative. In a similar vein, Slaughter and DePeyster[20] pointed out the seriousness of the symptoms and the progress to fatal termination if unrelieved. They recommended removal in all cases. In their own first case (Case 30) the patient, a 65-year-old woman with malignant hypertension (blood pressure 230 systolic and 130 diastolic, retinopathy), was a desperate risk; yet the ultimate outcome was successful. Koop, Jordan and Horn,[18] despite 1 death in 5 cases, recommended removal in all instances unless there are "specific contraindications." All other authors are evidently in agreement, since they report cases in which they have operated.

As to the growth propensity of pharyngeal schwannomas, Davidov[8] quaintly observed in 1931 that "these rare tumors are seldom encountered in laryngology, since the rapid development of the lesion places them over the boundary of operative pharyngology into the field of general surgery."

Biopsy.—Biopsy is admittedly difficult

in these cases. Thinking of the possibility of thrombosed carotid aneurysm, one hesitates to bite too deeply. More than one attempt may be necessary (Hall and Owens[11]; Koop, Jordan and Horn[18]). The danger of introducing infection into the tumor was mentioned also by the latter authors, who recommended omission of this step with the smaller tumors. My experience also illustrates the danger of introducing infection; yet, under careful observation, the situation can be kept under control. On the other hand, attempted excision without biopsy might prove embarrassing. (I recall the case of a young man with a large retropharyngeal mass, covered by intact mucosa, which proved on biopsy to be an extension of an anaplastic carcinoma of the schneiderian membrane via the nasopharynx.) The Memorial School (Ehrlich and Martin, Slaughter) prefer aspiration biopsy. This was tried once unsuccessfully in my case; further effort doubtless would have been rewarded.

Irradiation.—According to Hayes Martin,[31] irradiation therapy, whether by radium or roentgen rays, has no place in either preoperative or postoperative management of schwannoma, as this tumor is extraordinarily radioresistant. Such therapy may aggravate symptoms (Case 24) or make subsequent surgical procedures more difficult (Case 30). Irradiation before determination of a histologic diagnosis (Cases 11, 12, 24, 27 and 30 by persons other than the authors) is a practice in violation of the basic principles of oncology.

Tracheotomy. — Tracheotomy was done in only 3 previous instances. Heinatz* (1906), the first to report a case, performed tracheotomy before peroral operation, as did Koop, Jordan and Horn[18] in their third case (Case 26) after three unsuccessful attempts at biopsy. As in my own case, this was probably necessitated by increase in size of the mass subsequent to a breach in the pharyngeal mucosa. Michl[19] was the only previous surgeon to perform tracheotomy before an external operation.

Surgical Excision.—The most interesting question relates to the route of surgical extirpation. Traditionally, the otolaryngologist is said to prefer the peroral route and to abhor an external scar. Yet, after attempting peroral removal, a good many otolaryngologists have recognized the probably greater safety of an external approach, or described technical difficulties which allow the reader to draw his own conclusions. Thus Figi[1] in 1933 noted that, while encapsulated, the tumor sent projections laterally and inferiorly, and that, in removal, the capsule broke. Extensions were removed with a curet. Motley[12] in 1941 noted the tumor extending deep into the neck, in intimate association with the carotid artery and jugular vein. Separation of the tumor from these structures by the oral route was evidently a harrowing experience. The author stated: "Although this operative approach resulted in successful removal, on reconsideration I feel that tumors such as this might well be removed more safely by an external approach through the neck or at least after exposure of the great vessels of the neck so that prompt ligation could be done in case uncontrollable hemorrhage was encountered." Hill[15] in 1944, after encountering permanent paralysis of the vocal cords following peroral removal, stated: "Possibly operation by external approach would have resulted in less trauma to the vagus nerve. While the intraoral procedure was not especially difficult, it was necessary to exert some traction by applying a tenaculum to the tumor. The origin of the tumor was not established until after operation (vagus). There was a natural inclination to avoid an external scar." Turchik[16] in 1946, using the peroral route, found that part of the mass remained attached to the base of the skull posteriorly and had to be removed separately. In retrospect he advised the external approach ("lateral pharyngotomy á la Orton") as safer. New and Devine[30] in 1947 recommended ligation of the external carotid followed by intraoral attack upon the tumor, but they advised preliminary tracheotomy and an ex-

*Cited in article by Fantuzzi[4]

ternal approach in the presence of unusually large tumors. In their series there were temporary paralyses of the larynx, pharynx and palate. Difficulty in shelling out the tumor was occasionally encountered and surgical diathermy employed. In the series of 5 cases of Koop, Jordan and Horn,[18] external operations were performed in the first 2 and peroral in the remaining 3. In the fourth case "difficulty was encountered around the carotid sheath. A large vessel was ligated, evidently the internal carotid." The patient died. In the fifth case much bleeding was encountered and the cavity had to be packed. Having encountered trouble from intraoral biopsy (infection) and having, in 1 case, made three unsuccessful attempts—they recommended transoral excision without preliminary biopsy in cases of smaller tumors. For the larger tumors the external approach is preferred. Slaughter and DePeyster[20] used the external approach in 3 of their 4 cases. The first patient (Case 30) was operated upon transorally after an unsuccessful attempt by others at external excision, the first operation being followed by implantation of radon seeds. Great difficulty was encountered, and the tumor was removed piecemeal. In the last reported case, that of Kennon[2] (1950), the constrictor muscle was split after tonsillectomy. The tumor extended so far posteriorly that it had to be removed in pieces with a tonsil snare. Dysphagia persisted to the time of Kennon's report, and there was palatal paralysis on the side opposite the tumor, with regurgitation of liquids.

In summary, it is evident that, though on occasion these tumors may shell out rather easily on transoral removal, more commonly extensions are encountered which must be separately removed; intactness of the capsule is hard to maintain, and resort to morcellation is not unusual. Separation from the great vessels is difficult and hazardous, and complicating nerve palsies are more frequent. On the other hand, exclusive preoccupation with an external procedure may result in overlooking tumor remnants in the retropharyngeal area. Thus, Koop, Jordan and Horn,[18] performing a lateral, external operation in their first case, mentioned that the tumor was removed intact except for a small fragment near the biopsy site, which they apparently left *in situ*. With their second patient, similarly operated upon, they stressed the maintenance of mucosal integrity and aid in delivering the tumor by pressure with a finger in the pharynx. Thus it is that the surgeon who operates externally wishes to do an aseptic neck procedure without contamination from the pharynx, and the one who operates transorally wishes to avoid an external scar but may ligate an external carotid (4 cases: Figi,[1] Natanson,[5] Hall and Owens,[11] Slaughter and DePeyster[20]). Michl,[19] alone among those who operated externally, did not consider maintenance of integrity of the pharyngeal mucosa paramount, since he did a deliberate lateral pharyngotomy resulting in a temporary pharyngocervical fistula, which closed spontaneously after a few weeks.

Anatomic Considerations.—It is apparent that the nerves of origin of these tumors, chiefly the vagus and the sympathetic, lie in the posterior, or vascular, compartment of the parapharyngeal space. The accompanying illustration (Fig. 8) from the beautiful work of Grodinsky[32] on the fascial spaces of the neck, illustrates this. It is seen that the sympathetic chain lies just posterior to the great vascular bundle in space (4A) which, according to Grodinsky, extends from the base of the skull downward to become continuous with the axilla, from which it is separated by the fat between the clavicle and the first rib. In order to become retropharyngeal, a tumor arising from the sympathetic chain must invade either Space 3 or Space 4. In the former instance it would be bounded in front only by the visceral layer of fascia, in the latter by both visceral and the alar fascial layers. This fact undoubtedly explains the great difficulty experienced by several operators in securing adequate biopsies, for it is necessary to penetrate not only the mucosa and the pharyngeal constrictor but one or

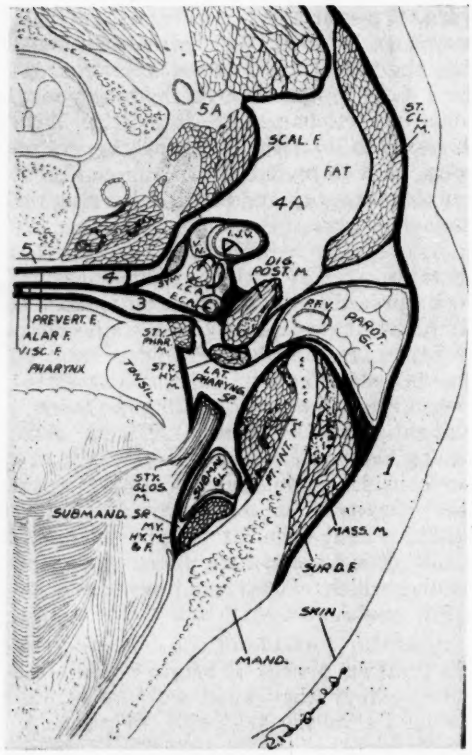


Fig. 8.—"Transverse section of adult cadaver through the tongue and palatine tonsil. Superior view," from Manual Grodinsky, M.D.[82]

A sympathetic schwannoma would originate in Space 4A and might invade Space 3 or Space 4, which are separated from each other by the alar fascia. This structure has been described by Grodinsky as a layer of fascia lying in a frontal plane between the visceral layer (behind the esophagus) and the prevertebral layer. It attaches to the latter at the tips of the transverse processes of the vertebrae and then continues anterolaterally to form the carotid sheaths. Grodinsky as a layer of fascia lying in a frontal only to the second thoracic level, while Space 4, extends freely into the posterior mediastinum.

even two layers of fascia with the intervening areolar tissue.

Scrutiny of the illustration from Grodinsky, again, does not reveal any *á priori* reason why the internal carotid artery should always be displaced medially, as was claimed by Slaughter and DePeyster[20] in their description of a new syndrome in cases of pharyngeal schwannoma of cranial nerve origin. Aside from these authors, only Ehrlich and Martin described, in 1 case (Case 20), a pulsation "over the apex" of the tumor. Cutler and Gross[25] described a lateral displacement of the artery by a vagal tumor.

A difficulty peculiar to these tumors was noted by Davidov,[8] whose patient was the first to be operated upon by the external route. The progress from parapharyngeal involvement alone to later invasion of the retropharyngeal space was noted. Although the operating surgeons separated the tumor by blunt dissection from the pharyngeal wall without a breach of the latter, he noted *dense adhesions in the remote posterior and superior part of the tumor* which made this separation extremely difficult. From experience in my own case a reason suggests itself for this. It will be recalled than an ovoid mass was removed through the neck, apparently complete. Yet careful inspection of the pharynx gave the impression, as in the first case of Koop, Jordan and Horn,[18] that residual tumor remained in the retropharynx. The intraoral procedure that ensued was beset by all the difficulties, with adhesions described by Davidov[8], Figi[1] and others; but, of course, separation from the great vessels had already been accomplished. Indeed, it will be recalled, the residual retropharyngeal portion of the tumor was grossly ill-defined and seemed gradually to fuse with the prevertebral musculature, an impression confirmed by histologic study, which showed a rather gradual transition between frank tumor tissue and normal muscle (Fig. 6). Now that the parapharyngeal area itself was no longer occupied by a space-filling mass but had reverted to its normal status as a "potential space," the observation of a narrow isthmus between the retropharyngeal tumor bed and the parapharyngeal area, with the end of the cervical drain in it, assumes significance. Evidently such a tumor has to "herniate" into the retropharyngeal space, and, in so doing, apparently loses its encapsulated character in this area, fusing intimately with the musculature of its new environment. Blunt dissection through the neck may,

as in my case, amputate the hernial extension of the tumor; and the delivery externally of an aparently complete ovoid mass is no guarantee that this has not occurred.

According to Ewing,[33] the prognosis in cases of deep-seated neurofibroma is very grave in the event of recurrence. Every effort should be made, therefore, to remove all tumor tissue. It is suggested that this can best be accomplished by a combined approach, as in my own case, the first so handled. With meticulous pharyngeal closure, antibiotics and external drainage, there is little to fear from the temporary pharyngocervical fistula thus created.

Acknowledgements: The author wishes to thank Dr. Leo Clements, Professor of Histology at Creighton University, for making the photomicrographs; Miss Pauline Kelly of the Photographic Department for her pictures of the gross specimen and X-rays; Dr. Charles Charvat of the Language Department for translating the article of R. Michl[19] from the Czech; Dr. Manuel Grodinsky for permission to use his cross section drawing "Transverse Section of Adult Cadaver Through the Tongue and Palatine Tonsil," and Dr. Hays Martin of Memorial Hospital for confirming the pathologic diagnosis and for his advice against postoperative roentgen therapy. He wishes also to thank Drs. J. P. Cogley and H. F. Trafton of the Cogley Clinic for their encouragement and assistance in the management of this case, and also Dr. I. Sternhill, the referring physician.

SUMMARY

1. A case of solitary schwannoma of the pharynx is reported, which is believed to present the largest tumor of this type ever described. The growth was removed by a combined cervical-intraoral operation, a procedure not hitherto employed in this disease, but one which is recommended as safest and surest for complete extirpation.

2. The gross and microscopic pathologic picture of schwannoma is briefly described and illustrated by the case reported. A brief historical note on schwannoma is included.

3. Review of the literature revealed only 17 previous cases of solitary pharyngeal schwannoma cited by American authors. The international literature, however, records 36. All cases are tabulated and critically discussed in the text. In 28 cases, operative data were available. In 20 cases the patients were operated on by the intraoral route, 4 of these with preliminary control of the ipsolateral external carotid artery. In 8 cases operation was performed by the external cervical route, in 1 instance of these by deliberate lateral pharyngotomy. Preliminary tracheotomy was employed in 3 previous cases. The problem of clinical management is discussed in detail—whether or not surgical intervention is indicated, the question of preliminary biopsy and preliminary tracheotomy. Irradiation in any form at any time is condemned.

4. The anatomic relations of the tumor are described in detail. Of note is the usual origin in the posterior compartment of the pharyngomaxillary space with later herniation into the retropharyngeal space, where the tumor may lose its encapsulated character, thus complicating the task of complete excision. The surgical implications of these facts are discussed.

SUMÁRIO

1. O autôr registra um caso de "Schwanoma solitario" do faringe, pensando apresentar a major tumôr dêsse tipo até então trazido a lume. A extirpação foi feita por uma intervenção combinada, cervical e intraoral, processo que até então não havia sido empregado para tratamento dessa enfermidade, porén o unico que poderia sêr indicado com seguranca e certeza para a completa extirpação do tumôr.

2. Os aspétós patologicos maco e microscopicos do "Schwanoma" são rapidamente descritos e ilustrados pelo caso relatado. Foi feito ainda um treve historico sôbre tais tumôres.

3. O autôr faz a revisão da literatura,

a qual revela que apenas 15 casos foram anteriormente registrados por autôres norte americanos, sendo, todavia, no mundoconhecidos 34 doentes portadôres de tais tumôres. Todos os casossão apreciados e criticados nêste artigo. Em 26 doentes os tempos operatórios foram discutidos, sendo que 18 foram operados pelva via de acésso intraloral (4 dêles com ligadura previa da arteria carotida externa correspondente) os outros 8 pela via cervical externa, um dêles por uma deliberada faringotomia lateral. A traqueotomia previa foi usada em 3 casos recentes. O problema da conduta clínica foi discutido em detalhes: Sêr ou não sêr indicada a operação; a questão da biopsia previa; o problema da traqueotomia preliminar. Diz o autôr que a irradiação, em qualquer tempo e sub qualquer forma é condenada.

4. As relações anatómicas do tumôr são detalhadamente descritas. Conclue que a origem usual do tumôr é na porção posterior do espaço faringo-maxilar, com posterior herniamento para o espaço retro-faringiano, onde o tumôr pode perder o seu carater encapsulante, o que vem complicar ainda mais o trabalho para a sua completa excisão. São por fim discutidas as complicações cirúrgicas oriundas dêsses fatos.

RIASSUNTO

1. L'autore riferisce un caso di schwannoma solitario della faringe, che è probabilmente il più gran tumore di questo tipo mai descritto. Il tumore fu asportato mediante un intervento combinato cervico-intraorale, con una tecnica sinora non usata nella cura di questa malattia ma raccomandata come la più sicura per la estirpazione completa.

2. Gli aspetti anatomoistopatologici della schwannoma sono stati brevemente descritti e illustrati dal caso riferito. Vi è anche una breve nota storica sul tumore.

3. Una rassegna della letteratura ha dimostrato che solo 15 casi di schwannoma faringeo solitario sono stati descritti precedentemente da autori americani. La letteratura internazionale, invece, ne riporta 34. Tutti i casi sono stati tabulati e discussi criticamente nell'articolo. Solo 26 di essi avevano dati operatori utilizzabili; 18 pazienti furono operati per via orale, 4 con controllo preventivo della carotide esterna omolaterale. Altri 8 furono operati per via cervicale, e uno di essi, deliberatamente, co faringotomia laterale. La tracheotomia preliminare fu usata in 3 dei casi più vecchi. Viene discusso in particolare il problema del trattamento: se l'intervento sia indicato oppure no, la questione della biopsia preliminare e della tracheotomia preliminare. Viene condannata la irradiazione in ogni forma e in qualunque momento.

4. Vengono descritti in dettaglio i rapporti anatomici del tumore. La sua origine abituale è la zona posteriore dello spazio faringo-mascellare, con fuoruscita successiva nello spazio retrofaringeo, dove il tumore può perdere il suo carattere incapsulato e quindi rendere più complicato il compito dell'escissione radicale. Vengono discusse le conseguenze chirurgiche di tali fatti.

RESUMEN

1. El autor comunica un caso de schwamoma solitario de la faríngе, que cree es el tumor más grande de este tipo descrito actualmente. El tumor fué extirpado por una operación combinada cervico-oral, procedimiento hasta ahora no empleado en la terapeu'tica de esta enfermedad, pero que se recomienda como el más innocuo y seguro para la extirpación total.

2. Se describen e ilustran brevemente en el caso comunicado, los caracteres patológicos macroscópicos y microscópicos del schwamoma. Se incluye una breve nota histórica.

3. La revisión de la literatura reveló solamente 15 comunicaciones previas de schwamoma solitario de la faríngе citado por autores americanos. Sin embargo, la literatura internacional registra 34. En este artículo se disponen todos los casos

en forma de tabla y se discuten. En 26 se dispuso de datos operatorios, 18 pacientes fueron operados por vía oral, 4 de estos con control preliminar de la arteria carótida externa ipsilateral. Ocho fueron operados por vía cervical externa, 1 de estos extraído por faringotomía lateral. En 3 de los primeros casos se empleo traqueotomía previa. Se discute en detalle el problema del cuidado clínico: cuando esta indicada la operación, la biopsia y la traqueotomía previas. Se condena la irradiación en cualquier forma y en cualquier tiempo.

4. Se describen en detalle las relaciones anatómicas del tumor. Es de notarse su origen raro en el compartimiento posterior del espacio faringomaxilar con hernia posterior al espacio retrofaríngeo, donde el tumor puede perder su caracter de encapsulado, complicándose así la tarea de la extirpación total. Se discuten las implicaciones quirúrgicas de estos hechos.

ZUSAMMENFASSUNG

1. Der Verfasser berichtet ueber einen Fall von solitaerem Neurinom der Schwannschen Scheide ("Schwannom") im Rachen. Er glaubt, dass es sich um die groesste bisher beschrieben Geschwulst dieser Art handelt. Der Tumor wurde mittels eines kombinierten zervikalintraoralen Eingriffs entfernt. Dieses Verfahren ist bisher in der Behandlung der vorliegenden Erkrankung nicht angewandt worden, wird aber als der sicherste Weg zu einer vollstaendigen Ausraeumung empfohlen.

2. Die makroskopischen und mikroskopischen Eigenheiten des Schwannoms werden kurz beschrieben und anhand des vorliegenden Falles erlaeutert. Die Arbeit enthaelt einen kurzen historischen Bericht ueber das Schwannom.

3. Die Durchsicht der Literatur ergab nur 15 fruchere Berichte amerikanischer Autoren ueber solitaere Schwannome des Rachens. Die internationale Literatur weist aber 34 Faelle auf. Alle diese werden in der vorliegenden Arbeit aufgezaehlt und einer kritischen Betrachtung unterzogen. Angaben ueber den operativen Eingriff lagen in 26 Faellen vor. 18 Kranke wurden auf intraoralem Wege operiert, vier davon nach vorheriger Versorgung der aeusseren Halsschlagader der kranken Seite.

4. Die anatomischen Beziehungen der Geschwulst werden in ihren Einzelheiten beschrieben. Bemerkenswert ist der uebliche Sitz ihres Ursprungs im hinteren Abschnitt des pharyngomaxillaren Raumes mit spaeterer Herniierung in den Retropharyngealraum. Hier kann die Geschwulst ihre Kapsel verlieren, was das Unternehmen einer voelligen Resektion erschwert. Die Bedeutung dieser Verhaeltnisse fuer das chirurgische Vorgehen wird eroertert.

REFERENCES

1. Figi, F.: Solitary Neurofibroma of the Pharynx, Arch. Otolaryngol. 17:386, 1933.
2. Kennon, W. G. Jr.: Neurinoma of Pharynx—Report of a Case, Laryngoscope, 60:388, 1950.
3. Verocay: Beitrag. Path. Anat. 48:1, 1910.
4. Fantuzzi, L.: Neurinoma retro-faringeo, Oto-Rhino-Laringologia Italiana, 14:134, 1946.
5. Natanson, L.: Des Tumeurs Retropharyngées, Rev. de Laryngol. Otol. & Rhinol. 56, 51-102, 1935. (2nd Medical Institute, Moscow).
6. Murray, M. R.; Stout, A. P., and Bradley, C. F.: Schwann Cell vs. Fibroblast as the Origin of Specific Nerve Sheath Tumor, Am. J. Path. 16:41, 1940.
7. Askanazy, M.: Arb. Path. Anat. Inst. Tübigen, 9:147, 1914.
8. Davidov, I.: Zur Klinik der Neurogenen Retropharyngealen Gaschwülste—Ztschr. f. Hals—Nasen & Ohrenheilkunde, p. 538, 25 Sept., 1931. (Charkow—State Ukranian Otolaryngologic Institute.)
9. Bruzzoni, C.: Annali di Laryngol., Otol., Rinol. & Faringologia, Nuova Serie: 11-12, 132, 1936-37.
10. Friedman, L., and Eisenberg, A.: Neurofibroma of the Hypoglossal Nerve, Ann. Surg. 101:834, 1935.
11. Hall, C., and Owens, H.: Solitary Neurofibroma of the Pharynx, Arch. Otolaryngol. 34: 1163, 1941.
12. Motley, F. E.: Position Malignancy, Arch. Otolaryngol. 34:771, 1941.
13. Lingeman, B. N.: Trans. Indiana Acad. Ophthalmol. & Otolaryngol. 25:65, 1941.
14. Ehrlich, H., and Martin, H.: Schwannomas in the Head and Neck, Surg., Gynec. & Obst. 76:577, 1943.
15. Hill, F. T.: Neurofibroma of Pharynx with Paralysis of Larynx Following Operation, Ann. Otol., Rhinol. & Laryngol. 53:326, 1944.

16. Turchik, F.: Schwannoma of Pharynx with Paralysis of Vocal Cord, Arch. Otolaryngol. 44: 568, 1946.

17. Violé, P.: Schwannoma of the Pharynx, Ann. Otol., Rhinol. & Laryngol. 55:334, 1946.

18. Koop, C.; Jordan, H., and Horn, R.: Neurolemmoma of Pharynx, Surg., Gynec. & Obst. 85:641-5, 1947.

19. Michl, R.: Neurinoma of the Hypopharynx, Lék. Listy 2:168, 1947.

20. Slaughter, D., and DePeyster, F. Pharyngeal Neurolemmoma of Cranial Nerve Origin, Arch. Surg. 59:386-397, 1949.

21. Somers, K.: Neurolemmoma of the Pharynx, Ann. Otol., Rhinol. & Laryngol. 61:636-641 (Sept.) 1952.

22. Hanley, J. S., and Davol, R. T.: Pharyngeal Neurilemmoma, Arch. Otolaryngol. 56:207-208, 1952.

23. Sekiguchi, S., and Oije, T.: Beitrag Zum Vagustumor (Neurinoma Sarcomatoides), Arch. f. Klin. Chir. 143:8, 1926.

24. Stout, A. P.: Am. J. Cancer 24:751, 1935.

25. Cutler, E., and Gross, R.: Neurofibroma and Neurofibrosarcoma of Peripheral Nerves, Arch. Surg. 33:733, 1936.

26. Bustos, F. M.: Schwannoma of the Pneumogastric Nerve: Case with Recovery after Ablation, Bol. y Trab. Acad. Argent. de Cir. 29:448 1935.

27. Murley, R. S.: A Case of Neurinoma of the Vagus Nerve in the Neck, Brit. J. Surg. 36:101, 1948.

28. Furrer, E., and Fox, F.: Perineural Fibrosarcoma of the Left Vagus Sheath: Report of a Case, West J. Surg. 48:584, 1940.

29. Foster, J. H.: Ganglion Cell Neuroma of Pharynx, Arch. Otolaryngol. 36:372, 1942.

30. New, G. B., and Devine: Neurogenic Tumors of the Nose and Throat, Arch. Otolaryngol. 46: 163, 1947.

31. Martin, H., personal communication.

32. Grodinsky, M.: Retropharyngeal and Lateral Pharyngeal Abscesses, Ann. Surg. 110:177-199, 1939 (see Fig. 5, p. 180).

33. Ewing, J.: Neoplastic Diseases. Philadelphia: W. B. Saunders Company, 1940.

For information pertaining to qualifications for

Fellowship, Associate Membership or Junior Membership in the

United States Section, International College of Surgeons

please communicate with

Dr. Karl A. Meyer, F.A.C.S., F.I.C.S.

1516 Lake Shore Drive

Chicago 10, Illinois

For information pertaining to qualifications for

Fellowship or Associate Membership

in the

Canadian Section, International College of Surgeons

please write

E. M. C. McAmmond, M.D.

Suite 2, 1701 West Broadway

Vancouver 9, B. C., Canada

Treatment of Angioneurotic Edema with Etamon-Benadryl Combinations

JOHN M. HAMMER, M.D., F.A.C.S., F.I.C.S.
KALAMAZOO, MICHIGAN

ANGIONEUROTIC edema and urticaria are encountered frequently in the daily practice of both the general practitioner and the specialist, especially those engaged in industrial medicine and surgery. Many of these allergic reactions are produced by the drugs in common use. Regardless of the cause of the reaction, the patient is interested primarily in the relief of his symptoms, and he judges the effectiveness of the treatment by the rapidity with which he obtains relief. Absenteeism is an important factor to the patient, since angioneurotic edema usually entails a loss of working time and income.

Actually urticaria, or hives, and angioneurotic edema are essentially the same allergic manifestation, differing only in location and depth of the edematous swellings.[1] The urticarial lesions are more superficial, involving the dermis, and are accompanied by itching. The lesions of angioneurotic edema are located in the subcutaneous tissues and deeper structures. Either condition may be generalized or localized. The important etiologic factor involved is apparently an allergy to an endless list of substances. Far up on this list are the drugs common to every doctor's office, such as aspirin, phenolphthalein, coal tar derivatives, opiates, barbiturates, sulfonamides, antibiotics, sera, hormones, vitamins and a host of others too numerous to list.

Urticaria responds to epinephrine, aminophyllin and the antihistaminics, but angioneurotic edema is not relieved by them. Epinephrine is effective only in such large doses that the alarming side effects produced make its use undesirable. The ease with which the superficial urticaria can be treated and the difficulty encountered in treating the more deep-seated angioneurotic edema necessitate a new approach to the subject.

It has been shown that in anaphylaxis or in the presence of an allergy histamine is liberated into the blood stream. One of the body's defense mechanisms against an offending agent of this type is vasospasm, which is essentially an attempt by the body to localize the allergen and to prevent this offending agent from reaching other parts of the body. If the vasospasm persists over too long a period, anoxia develops in the tissues being protected and is manifested by an increased permeability of the capillary walls, with an outpouring of serum into the surrounding tissues. When this reaction is superficial an urticarial wheal occurs, and when it is in the deeper structures angioneurotic edema develops. This reasoning would place these conditions in the class of vasospastic diseases.

With this possibility in mind, it occurred to me that the ineffectiveness of antihistaminics in the treatment of angioneurotic edema might be due to the vasospasm preventing their access to the inside of the edematous area. If so, a ganglionic blocking agent might relieve the vasospasm and permit the antihistamine to arrive at the desired area of action where it could bring relief to the patient.

A combination of a ganglionic blocking agent and an antihistaminic, Etamon and Benadryl, was used in 24 cases of angioneurotic edema and was found effective in every case.

Procedure.—The edematous areas, the

Submitted for publication Feb. 10, 1953.

heart, lungs, pulse, temperature, blood pressure and respiration of each patient were checked and recorded. The patients were placed in the supine position, and the drugs were administered intravenously. All patients were kept flat until the symptoms of postural hypotension from the Etamon disappeared, or for approximately thirty minutes. During this time they were asked to describe their reactions and state whether or not they were obtaining relief.

As a control, the same series of patients was first given 3 to 7 ml. of Benadryl or 1 to 2 ml. of Etamon intravenously or 0.25 to 0.5 ml. of 1:1,000 epinephrine in oil subcutaneously. None obtained objective relief of the itching from any of the three. Those who had been given Benadryl were then given Etamon, those who had received Etamon were given Benadryl, and those who had been given epinephrine received the combination of Etamon and Benadryl. In this manner all patients received the combination of Etamon and Benadryl, and at the same time clinical controls were obtained.

The patients were given oral antihistaminics to take until they returned on the following day. The usual patient required three injections before he could be maintained on an oral antihistaminic alone.

The majority of patients treated were industrial, the commonest causes of allergy being antibiotics, sulfonamides and tetanus antitoxin. Some reactions were encountered in sportsmen and gardeners who had been exposed to certain plant products, such as poison ivy and sumac.

The duration of treatment was shortened, and consequently the patients lost less time from work than with any method of treatment previously used. The new treatment was also less expensive.

Since the subjective symptom of pruritus and direct observation of the welts were used to guide and evaluate the treatment, I realize that this is a clinical impression only; and I am aware that urticaria and angioneurotic edema are known to disappear spontaneously once the offending agent has been removed.

CONCLUSIONS

1. Angioneurotic edema due to known allergens was treated in 24 cases with a combination of a ganglionic blocking agent and an antihistaminic, Etamon and Benadryl. The patients obtained relief more quickly than with either Etamon or Benadryl alone or with epinephrine.

2. This was a clinical experiment, the patients themselves being used as their own controls.

CONCLUSOES

1. O edema angioneurótico de origem alérgica conhecida, foi tratado em 24 casos pela associação de agentes bloquiadôres ganglionares e anti-histâminicos, Etamon e Benadril. Os doentes obtiveram melhoras mais rapidas do que nos casos em que o Ethamon e o Benadril eram empregados separadamente, ou associados com a adremalina.

2. Foi esta uma experimentação clínica, servindo os proprios pacientes como controladôres dos resultados obtidos.

CONCLUSIONES

1. Se trataron 24 casos de edema angioneurótico debido a alergenos conocidos con una combinación de un agente bloqueador de los ganglios y un antihistamínico. Etamon y Benadryl. Los pacientes obtuvieron alivio mas rapidamente que con Etamon ó Benadryl solos ó con epinefrina.

2. Se trata de un experimento clínico, los mismos pacientes fueron usados como testigos.

RÉSUMÈ

Un blocage ganglionnaire associé à des anti-histaminiques fut employé pour 24 cas d'oedéme angioneurotique. Les résultats sont meilleurs qu'avec l'Etamon ou la Bénadryl seuls.

SCHLUSSFOLGERUNGEN

1. 24 Fälle von angioneurotischem Odem, in denen das verantwortliche Allergen bekannt war, wurden mit einer Kombination von Blockierung des Ganglions und einem Antihistamin-Präparat (Etamon und Benedryl) behandelt. Die Wiederherstellung der Kranken erfolgte rascher als unter Etamon oder Benedryl oder Epinephrin allein.

2. Es handelte sich um ein klinisches Experiment, bei dem die Kranken gleichzeitig für Kontrollversuche benutzt wurden.

CONCLUSIONI

1. L'edema angioneurotico, da allergeni noti, fu curato in 24 casi con una combinazione di ganglioplegici assieme ad un antistaminico, Etamon e Benedryl. I pazienti migliorarono molto piú rapidamente che con Etamon e Benedryl soli o con adrenalina.

2. Questo si deve considerare come un esperimento clinico dal momento che i pazienti furono usati come controllo di se stessi.

REFERENCE

Feinberg, S. M.: Allergy in Practice. Chicago: Yearbook Publishers, Inc., 1946, p. 649.

Committee on Arrangements for the International Surgeons' Hall of Fame

Plans and arrangements for the Surgeons' Hall of Fame are actively in progress. The Committee is as follows:

Rudolf Nissen, M.D., F.A.C.S., F.I.C.S. (Hon.) University of Basel, Switzerland, Chairman

Morris Fishbein, M.D., F.I.C.S. (Hon.), Co-Chairman

Henry W. Meyerding, M.D., F.A.C.S., F.I.C.S., Rochester, Minnesota

Raffaele Bastianelli, F.I.C.S. (Hon.), Rome, Italy

Raffaele Paolucci, M.D., F.I.C.S. (Hon.), Rome, Italy

G. E. Konjetzny, M.D., F.I.C.S. (Hon.) Hamburg, Germany

A. Mario Dogliotti, M.D., F.A.C.S. (Hon.), F.I.C.S. (Hon.), Torino, Italy

Sir Zachary Cope, M.B., F.R.C.S. (Eng.) F.I.C.S. (Hon.), London, England

Carlos Gama, M.D., F.B.C.S., F.I.C.S. (Hon.), Sao Paulo, Brazil

Alexander Brunschwig, M.D., F.A.C.S., F.I.C.S. (Hon.), New York

Hans Finsterer, M.D., F.R.C.M. (Hon., Eng.), F.I.C.S. (Hon.), Vienna, Austria

Raymond Darget, M.D., F.I.C.S. (Hon.), Bordeaux, France

Felix Mandl, M.D., F.I.C.S. (Hon.), Vienna, Austria

Virgil T. De Vault, M.D., F.A.C.S., F.I.C.S., Washington, D. C.

The rules and regulations adopted, as well as the criteria for admission and the details of procedure and protocol, will be announced in the near future.

Transection and Repair of the Vena Cava Above the Renal Veins During Removal of a Teratoma

SHATTUCK W. HARTWELL, M.D., Ph.D., F.A.C.S., D.A.B.S.
MUSKEGON, MICHIGAN

LIGATION of the vena cava below the renal veins is a fairly recent development in the surgical treatment of human adults. No case of transection and repair of the human vena cava has come to my attention. The following report of a case in which a huge retroperitoneal teratoma occurred in a baby 2 months old is of special interest because it records the transection and repair of the human vena cava above the renal veins.

REPORT OF CASE

I. J., a Negro girl, delivered at full term on Jan. 8, 1949, was admitted to Mercy Hospital, Muskegon, on February 2, with a diagnosis of pneumonia. There had been no previous illness. In addition to thoracic and roentgen signs of pneumonia, physical examination on admission revealed a distended abdomen and an umbilical hernia.

A roentgenogram of the abdomen taken on March 3 showed a mass more than filling the entire right half of the abdomen and displacing the entire gastrointestinal tract to the left. Several small areas of calcification were visible in the anteroposterior view, but they were not seen in the lateral view. The pelvis and the lumbar portion of the spine were normal. The roentgen diagnosis was "neoplasm, most likely a teratoma; possibly a Wilms tumor."

Examination of the blood on March 4 revealed 6,500,000 erythrocytes per cubic millimeter, with 20 Gm. of hemoglobin, and 20,000 leukocytes per cubic millimeter, of which 43 per cent were polymorphonuclear. Urinalysis on March 5 showed 2 plus albumin, 20 to 25 leukocytes per high power field, and 7 to 10 erythrocytes per high power field, with some in clumps.

Surgical consultation on March 5 was obtained and recorded as follows: "Diagnosis: Wilms' tumor of right kidney or possibly huge hydronephroma; possible teratoma. Explore and remove if possible; risk IV." The parents accepted the risk.

Operation was undertaken on March 10 with ether anesthesia. A long right rectus incision disclosed a retroperitoneal cyst occupying the entire right side of the abdomen and much of the left. The posterior peritoneum was incised over the tumor mass. A markedly flattened kidney, displaced into the lower half of the abdomen and in contact with the bladder and the anterior abdominal wall, appeared to form part of the cyst's wall. At this stage of the operation the tumor appeared to be a huge hydronephroma of the right renal pelvis. Blunt dissection was sufficient over most of the presenting surfaces. Two apparently fibrous bands prevented mobilization of the mass. The larger band—flat, grey, and 7 mm. wide—passed from beneath the liver near the midline directly over the cyst's anterior surface, indenting it with a longitudinal sulcus, to disappear into the pelvis. The other, much smaller band, about the diameter of common string, ran obliquely over the right convex surface of the cyst from behind, forward and caudally, to end in the cellular mass of renal tissue. Although the possibility that the larger band was the displaced vena cava was considered, no blood could be found in it at any visible point; so this possibility was discounted, and the band was severed between two hemostats as the only conceivable way in which this cyst-tumor could be further mobilized. The resulting release of tension disclosed the fibrous band to be a large collapsed vein. Both cut ends were ligated.

The more lateral cordlike, oblique band also had to be severed to mobilize the cyst-tumor. Again the cord proved to be a vessel, this time a tiny but very long artery which, further dissection disclosed, led to the renal tissue in the

Submitted for publication Dec. 7, 1952.

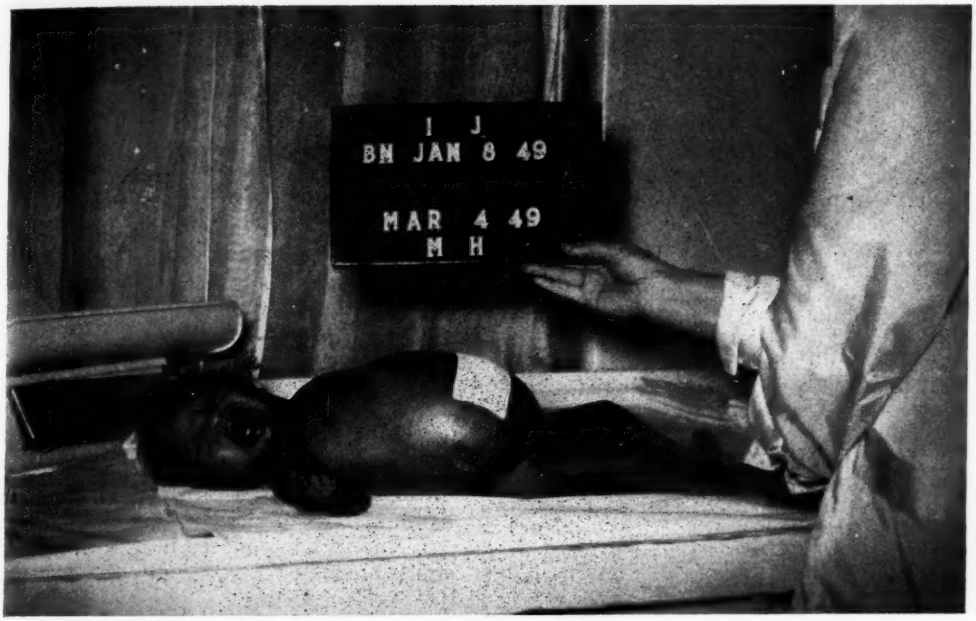


Fig. 1.—Photograph showing 8-week-old infant with abdomen distended by cystic teratoma. (The adhesive tape retains a large umbilical hernia.)

right lower quadrant. Once the cordlike artery had been severed, the kidney was observed to be in a plane separate from the wall of the cyst-tumor. For the first time it was clear that the right kidney, instead of being an integral part of the cyst-tumor, was merely displaced by the cyst, and that the plane of dissection passed between the syst and the right kidney.

The left kidney and its vessels were then explored for orientation. During this procedure it was observed that the left renal vein entered the bloodless, pressure-collapsed vein which had been severed and ligated farther cephalad; this proved the severed band to be the vena cava. Supporting proof came when further mobilization of the cyst-tumor permitted the two common iliac veins to be seen as tributary vessels.

No right renal artery was demonstrable, other than the little, stretched "cord" which had been cut lateral to the cyst-tumor to permit is mobilizaion. As the arterial supply of the right kidney had been interrupted and repair of the artery seemed impossible, right nephrectomy was performed.

Dissection around the left side of the retroperitoneal cyst-tumor involved only minor vessels until the area of the celiac ganglion was reached. Here numerous nerve fibers passed directly into a cellular mass which lay within the capsule of the cyst and formed its posterior and superior wall. To free the tumor it was necessary to cut these fibers, which constituted the only fixed point of attachment of the cyst-tumor.

After removal of the intact cyst-tumor, the redundant and previously ligated ends of the vena cava were excised. With no vascular clamps available, "mosquito clamps" were used to prevent bleeding. End-to-end anastomosis was performed, 00000 gauge silk sutures being employed. With the release of the clamps, blood flowed freely through the lumen. Two small leaks were readily repaired. A small amount of Oxycel was placed around the anastomosis, which was functioning without leakage.

Forty ml. of citrated blood was injected into the proximal portion of the vena cava. Light finger pressure alone controlled any back bleeding from the small veni puncture hole. The posterior peritoneum was then closed, and the abdominal wall was closed in layers. One hundred and forty ml. of citrated blood was

left in the peritoneal cavity.

At the end of the operation the baby's skin was warm and dry. The pulse and general condition were fairly good.

The pathologist recorded the mass as measuring 14 by 10 by 7 cm.; a deformed kidney measured 6.5 by 4.5 cm. The tumor was a cystic teratoma.

The baby made an uneventful recovery. The wound healed without incident. She was discharged from the hospital on March 22, the twelfth postoperative day.

On October 18 the baby was readmitted to the hospital because of a respiratory infection. A congenital umbilical hernia enlarged rapidly and began causing colic during this illness. Subsequent to recovery from the respiratory infection, on December 3, excision and repair of the umbilical hernia was done. At this operation, finger exploration of the abdomen and the posterior abdominal wall for abnormalities gave entirely negative results. Recovery was again uneventful, and the baby went home on December 14, the eleventh postoperative day. The growth and development of the child have since been entirely normal.

Fig. 2.—Anteroposterior roentgen view of abdomen.

SUMMARY

A case is reported in which transection and repair of the vena cava above the renal veins during removal of a huge retroperitoneal teratoma in an infant 2 months old. The author states that no other such case has come to his attention.

RIASSUNTO

Viene riferito un caso di resezione e ricostruzione della vena cava al di sopra delle vene renali durante l'asportazione di un enorme teratoma retroperitoneale in un bambino di 2 mesi.

L'Autore non conosce nessun altro caso simile a questo.

SUMARIO

O autôr registra um caso de lesão e reparo imediato da vêia cava, sôbre as vêias renais, durante a extirpação de um teratôma retro-peritoneal, em criança dom dois mêses de idade. Esclarece o autôr, que nenhum caso semelhante chegou ao seu conhecimento.

RESUMEN

Se comunica un caso en el cual se seccionó y reparó la vena cava encima de las venas renales durante la extirpación de un teratoma retroperitoneal de gran tamaño en un niño de 2 mese de edad. El autor asienta el desconocimiento de casos semejantes.

RÉSUMÈ

L'auteur rapporte ses résultats d'un cas de section et suture de la veine cava au-dessus des veines rénales. C'était un enfant de 2 mois présentant un tératome rétro-péritonéal.

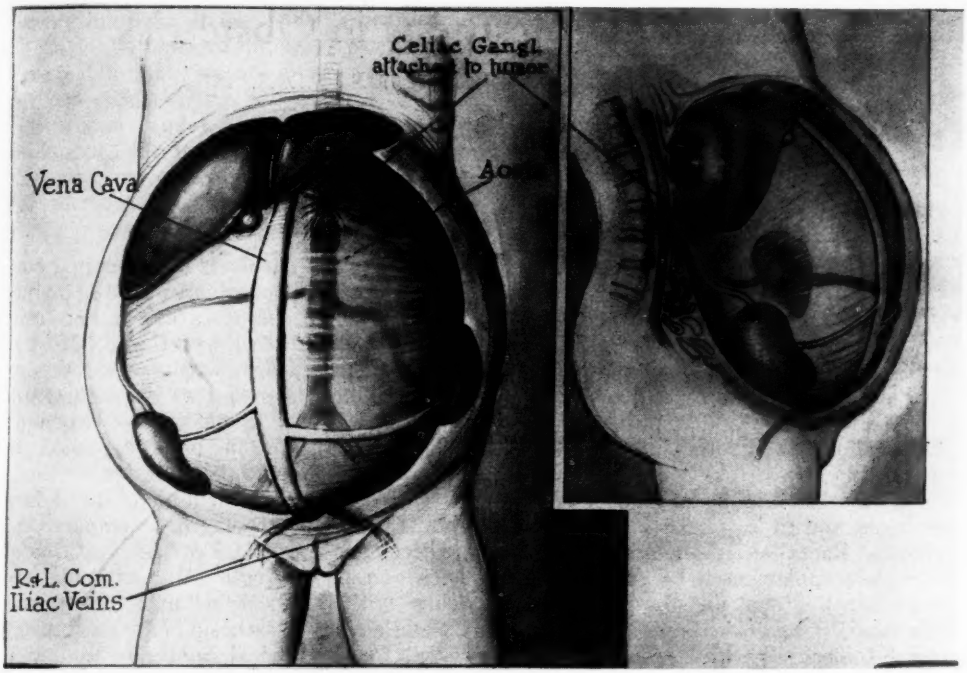


Fig. 3.—Drawings to show anatomic relations of the tumor. *A*, anterior view; *B*, lateral view.

ZUSAMMENFASSUNG

Es wird ein Fall berichtet, in dem bei der Resektion eines grossen retroperitonealen Teratoms eines zwei Monate alten Säuglings die V. cava oberhalb der Nierenvenen durchschnitten und wiederhergestellt wurde. Der Verfasser bemerkts, dass ihm kein ähnlicher Fall zur Kenntnis gekommen ist.

Schedule of 1953 Meetings of the Executive Council
United States Section of the International College of Surgeons

February 21, 1953	August 22, 1953
May 23, 1953	November 21, 1953

Saddle Block Anesthesia in Obstetrics

EUGENE A. CONTI, M.D., F.A.C.S., F.I.C.S.
AND
DANIEL E. NATALI, M.D.
PITTSBURGH, PENNSYLVANIA

DURING the past ten years there has been a rapid trend toward conduction analgesia and anesthesia in obstetrics. Inhalation anesthesia supplementing heavy preanesthetic analgesic and sedative medication had resulted in fetal narcosis and anoxia and in maternal complications, such as aspiration of vomitus[1] and pneumonitis. Sodium pentothal in small doses is suitable only for terminal anesthesia and in large doses causes fetal asphyxia. Rectal ether, though safe, must always be supplemented by an inhalation anesthetic. Regional anesthesia (perineal infiltration, paracervical, parasacral, and pudendal block) requires cooperation of the patient and often results in anesthesia of insufficient depth. The patient obtains no relief from the severest discomfort of labor by these methods. In trained hands, continuous caudal anesthesia gives excellent relief with safety, but it is time-consuming and requires more technical skill.[2] The same may be said of epidural anesthesia. Since 1946, when Adriani described the use of saddle block anesthesia with nupercaine in obstetrics[3] the use of this type of analgesia and anesthesia has grown rapidly.

Spinal anesthesia has been considered dangerous, particularly in obstetrics. This reputation was deserved before development of the technic that stressed hyperbaric solutions in small amounts, localized at low levels to give specific relief. Previously many authors had reported deaths and serious accidents. Kennedy and his co-workers had reviewed the literature for cases of grave paralysis of the spinal cord attributable to spinal anesthesia.[4] Since 1946 a voluminous literature has accumulated on saddle block anesthesia. Most of it is commendatory, with several reports of its use in large series of normal and operative cases.[5] Some of the opponents of spinal anesthesia have conceded its greater safety with the newer methods. Greenhill,[6] who is a firm advocate of local infiltration anesthesia, has tempered his criticism in the 1951 *Year Book of Obstetrics and Gynecology*.[7] Our attitude concurs with Herbert Schmitz' statement: "Saddle block anesthesia is the most nearly ideal for obstetrical analgesia and anesthesia if used judiciously by an experienced obstetrician."[8]

We are presenting a five-year study of 2,607 instances of the use of saddle block anesthesia in a series of 6,788 deliveries at the Pittsburgh Hospital.

TABLE 1.—*Distribution of Anesthetic Technics*

Year	*Deliveries*	*Saddle Block*	*Other Anesthesia*
1947	1,421	64 (5%)	1,357 (95%)
1948	1,233	212 (17%)	1,021 (83%)
1949	1,297	455 (35%)	842 (65%)
1950	1,388	884 (63%)	504 (37%)
1951	1,449	992 (69%)	457 (31%)
5 years	6,788	2,607 (39%)	4,181 (61%)

There has been an increasingly rapid progression in the percentage of patients receiving this anesthesia, from 5 per cent in 1947 to 69 per cent in 1951. The trend is even more pronounced than these figures show, since the patients of courtesy staff members, comprising about 15 per cent of the deliveries, are given conduction anesthesia only when it is definitely indicated.

In addition, the contraindications to saddle block anesthesia are strictly ob-

From the Obstetrical Department, Pittsburgh Hospital.
Read at the Northeastern Regional Meeting of the United States Chapter, International College of Surgeons, Pittsburgh, March 13, 1952.
Submitted for publication June 11, 1952.

served, and no patient who is prejudiced against the anesthesia is given it. The greatest number of other anesthetics are nitrous oxide—oxygen—ether, with some continuous caudal anesthesia, a few low pudendal blocks or perineal infiltrations and on rare occasions, sodium pentothal for terminal anesthesia.

TABLE 2.—*Gravidity*

Primigravidae	*Multigravidae*
870	1,737

The gravidity is indicated in Table 2. It is of no particular significance. Two thirds of the patients were multigravidae and one third primigravidae.

TABLE 3.—*Duration of Anesthesia, Single Block*

Under 21 minutes	70
20 minutes to 2 hours	2,399
2 hours to 3 hours and 55 minutes	128

Average 2,597 blocks=66 minutes
(10 patients had 2 blocks)

The duration of anesthesia is indicated in Table 3. In 70 cases the anesthetic was given for delivery only. In 2,399 the duration of anesthesia was from twenty minutes to two hours, and in 128 cases the anesthetic was effective for longer than two hours, the most prolonged period being three hours and fifty-five minutes. The duration has been calculated from the time of administration to the end of labor. The average for the entire group was sixty-six minutes. In Dr. Herbert Schmitz' series the average duration was one to two hours, with extremes of one to five hours. Adriani[3] reported more prolonged effective pain relief than we were able to obtain. We believe that relief of the severe pain of late first-stage and second-stage labor is one of the most advantageous effects of saddle block anesthesia. While it is suitable for delivery only, its greatest benefit is not obtained if its use is confined to that purpose. In our experience the time of administration should be calculated, in the average case, so that delivery will follow the administration in one and one-half hours.

TABLE 4.—*Use of Supplementary Anesthetics*

	Supplementary	*Saddle Only*
Gas	125	
Gas-oxygen-ether	51	
Pentothal sodium	2	
Local	2	
Ether	3	
Total	183 (7%)	2,424 (93%)

6 complete failures

Saddle block was the only form of anesthesia used in 93 per cent of the cases. Supplementary anesthesia of the type indicated was necessary in 7 per cent. It was given when the block was administered too early in labor or when relief of pain was unsatisfactory. We do not hesitate to give supplementary anesthesia under these circumstances. There were 6 complete failures, presumably because the nupercaine was not injected into the subarachnoid space.

TABLE 5.—*Changes in Pulse Rate and Blood Pressure*

	Average Change	*Greatest Change*
Pulse rate	5	80
Blood pressure	14 mm.	120 mm.

Pressor medication, 104 of 2,607 (4%)

The changes in pulse rate and blood pressure are shown in Table 5. Changes in pulse rate were insignificant. The average change in blood pressure was 14 mm. of mercury. The greatest change was 120 mm. of mercury and occurred in a case of toxemia with hypertension. In 4 per cent, methedrine sulfate, 20 mg. or ephedrine sulfate, ⅜ gr., was administered because of a more than average drop in pressure. In the latter part of this series pressor medication was given less and less frequently. Elevation of the lower extremities and intravenous dextrose given for hydration combined to control depression of blood pressure quite adequately. We are reluctant to use vasoconstricting agents because, in 2 cases, when they were given and followed by ergotrate in the third stage, rather sudden hypertension resulted, and 1 patient had several convulsions. Both complained of intense headache immediately after the aforementioned procedure. We now feel that, when pressor

medication must be given, oxytocics should not follow within a short interval. It was further noted that in a small percentage of cases the hypotension resulted in relative fetal bradycardia, which responded to oxygen inhalations with no effects deleterious to the fetus.

TABLE 6.—*Uncomplicated Deliveries*

Spontaneous	1,179	(45%)
Low forceps	1,017	(39%)
Breech manual aid	64	
Cesarean section	14	
	2,273 of 2,640	(86%)

Twins — 33

A study of these data reveals that 86 per cent of the deliveries were uncomplicated by any factor that could be attributed to the anesthetic. In 14 per cent there was some form of arrested progress, the most common of which was failure of rotation. This is a hazard that must be accepted if the benefits of conduction anesthesia are to be gained. It is inevitable that paralysis of the muscles of the pelvic floor, which are the resistance factor that encourages rotation, will cause a greater number of persistent "occiput posterior" and transverse arrests. Delivery in these cases is greatly facilitated by the lack of soft tissue resistance under saddle block. However, we should like to emphasize that, because of this undesirable effect of conduction anesthesia, it is imperative that expert obstetric technic be followed, lest the benefits derived from the anesthesia be offset by the dangers of inexpert obstetric maneuvers. With extensive intrauterine manipulation, as in internal podalic version, supplementary anesthesia is required.

Table 8 lists a group of conditions generally accepted as contraindications to general anesthesia, and ideally suited for conduction anesthesia. The problem of premature labor will be treated later. Toxemia with hypertension is ideally suited to conduction anesthesia, which has a beneficial effect on the blood pressure. Recently severe pre-eclampsia and eclampsia have been successfully treated by continuous spinal anesthesia. It has been shown to depress the blood pressure, improve the urinary output and lower the fetal mortality rate.[9]

Table 9 lists the puerperal complications. There were 2 cases of foot drop, in 1 of which the patient was totally well within a week. In the other the response was slow and some residuum was present until five months later. The patient with convulsions has been explained. The unusually large number of retained placentas, with postpartum hemorrhage in 21 cases, cannot be attributed directly to the anesthesia. During this period we have been concurrently investigating management of the third stage of labor. We have used intramuscular pitocin and intravenous drip pitocin. Ergotrate has been

TABLE 7.—*Complications*

Labor	*Mid. Forceps AP*	*Pomeroy MF*	*Kielland MF*	*Barton MF*	*Scanzoni MF*	*Version Extraction*	*Breech Extraction*
Failure of rotation—287							
Uterine inertia—32							
Mid. P. arrest AP—8	36	37	198	7	31	28 (6 on 2d twin)	36
Brow pres.—1							
Face pres.—3							
Shoulder pres.—4							
Arrested Breech—36							

Operative intervention, 367 (14%)

TABLE 8.—*Conditions Indicating Conduction Anesthesia*

Premature labor	109
Toxemia with hypertension	52
Eclampsia	1
Heart disease	21
Tuberculosis (4 with pneumothorax)	8
Bronchiectasis	1
Bronchial asthma	1
Diabetes mellitus	2

TABLE 9.—*Puerperal Complications*
Spinal headaches (no record in 1947)
228 of 2,533 (9%)

Foot drop	2	
Convulsions	1	
Eclampsia	2	
Retained placenta	53	36 manual removal 14 spontaneous 3 D & C late
Postpartum hemorrhage	21	

used both intramuscularly and intravenously with crowning of the head, after delivery of the infant and expulsion of the placenta. We have been trying to correlate the relation of the various methods of management with the duration of the third stage and the amount of blood lost. It is our impression that the large number of retained placentas resulted from these studies. We concur with the reports of others concerning the diminshed blood loss so apparent with saddle block as compared to that occurring with general anesthesia.

Postspinal headache occurred in 228 patients, or 9 per cent. Cartwright[2] of Pasadena reported 8 per cent. Schmitz[8] reported 14 per cent. The incidence seems to be consistently between 8 and 15 per cent. It is a very distressing complication. The majority are not severe, but an occasional one is extremely painful to the patient and disturbing to the obstetrician. Causes of postspinal headache have been reported[10] as (1) orthostatic hypotension associated with orthostatic tachycardia; (2) abrupt release of intra-abdominal pressure plus pooling of blood in the splanchnic vessels, caused by the anesthetic, and (3) leakage of spinal fluid. We have tried all the medication recommended in the literature with no constant results. We have used tight epigastric binders, which have proved partially successful. Starting with a 20-gauge needle at the beginning of this study, we have gradually progressed to the use of a 24-gauge, and are beginning to use a 26-gauge needle. The incidence of headaches has gradually diminished, and in our opinion this is the solution of the problem.

One of the greatest advantages of conduction anesthesia is the absence of fetal narcosis, which is of particular importance if the infant is premature. Table 10 demonstrates a survival rate 25 per cent greater among viable premature infants when saddle block anesthesia was used. We are convinced that these figures, which include 276 infants weighing between 1,000 and 2,500 Gm., are reasonably conclusive. Other reports of comparatively large series confirm this observation.[11]

Table 11 lists the causes of morbidity in these patients by the standard of the Committee on Maternal Welfare. None were peculiar to the type of anesthesia employed. In the majority of cases the morbidity lasted two to three days, and all of the patients but 1 left the hospital before the fifteenth postpartum day. One patient with thrombophlebitis was in the hospital for forty-two days, and in the other case of phlebitis the condition occurred after the patient's discharge from the hospital.

There were 2 deaths in this series of 2,607 cases, neither of which could be attributed to the anesthesia. In both cases autopsy was performed. In the first case (1948) there was an unrecognized perfo-

TABLE 10.—*Premature Neonatal Mortality Infants Weighing 1,100 to 2,500 Gm.*

	Born Alive	*Neonatal Death*	*Surviving*
Saddle block	109	21	89%
Other anesthesia	167	61	64%

TABLE 11.—*Morbidity*

Endometritis	6
Infection of urinary tract	11
Infection of perineum	2
Phlebitis	2
Acute bronchitis	1
Undetermined	2

TABLE 12.—*Maternal Mortality*

1948	1	Uterus ruptured through myomectomy scar
1949	1	Intracranial hemorrhage; possible tuberculoma

ration of the uterus through an old myomectomy scar. In the second case (1949) there was a sudden intracranial hemorrhage on the day after delivery in a patient who was apparently well. Autopsy revealed an old asymptomatic cerebral lesion, possibly a tuberculoma, which had eroded into a blood vessel.

SUMMARY AND CONCLUSIONS

A series of 2,607 saddle block anesthesias in a total of 6,788 deliveries at Pittsburgh Hospital is presented. The following conclusions have been drawn:

1. The trend in obstetrics is toward conduction anesthesia.
2. Saddle block anesthesia with trained personnel gives satisfactory relief during labor, with safety.
3. The psychologic benefit of consciousness during delivery is an additional asset.
4. The absence of fetal narcosis is one of the most desirable features of saddle block anesthesia. General anesthesia should not be used in premature labor.
5. If saddle block anesthesia is used for relief of pain during labor, the increase in operative intervention makes skilled obstetrical technic a prerequisite to safety.
6. The following contraindications to saddle block anesthesia should be strictly observed: (a) infection about the site of injection; (b) neurologic disease; (c) severe hypotension; (d) hemorrhage; (e) serious maternal objection to spinal anesthesia, and (f) allergy to the drug employed.

RIASSUNTO E CONCLUSIONI

Viene presentata una serie di 2607 anestesie caudali sacrali in un totale di 6788 pazienti ostetriche al Pittsburgh Hospital. Sono state tratte le seguenti conclusioni:

1. In ostetricia si ha tendenza all'anestesia di conduzione.
2. L'anestesia caudale sacrale con personale allenato dà un soddisfacente sollievo durante il parto, senza pericolo.
3. A ciò si aggiunga il vantaggio dal punto di vista psicologico della piena coscienza durante il parto.
4. L'assenza della narcosi fetale è uno dei piú desiderabili fattori dell'anestesia caudale sacrale. Non dovrebbe essere usata una anestesia generale nel parto prematuro.
5. Se l'anestesia caudale sacrale viene usata come sollievo al dolore durante il parto, l'aumento nell'intervento operatorio costituisce un pre- requisito di sicurezza all'abile tecnica ostetrica.
6. Dovrebbero essere osservate severamente le seguenti controindicazioni all'anestesia caudale sacrale: (a) infezione intorno al luogo di iniezione; (b) malattie neurologiche; (c) grave ipotensione; (d) emorragia; (e) grave contraindicazione materna al l'anestesia spinale; (f) allergia per la sostanza impiegata.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es wird eine Serie von 2,607 Sattelanästhesien vorgestellt, die an Patienten der geburtshilflichen Abteilung des Pittsburger Krankenhouses ausgeführt wurden. Die Gesamtzahl der geburtshilflichen Patientinnen, aus der die Serie gewählt wurde, betrug 6788. Folgende Schlussfolgerungen werden gezogen:

1. In der Geburtshilfe macht sich eine Tendenz zur Leitungsanästhesie bemerkbar.
2. Bei gut ausgebildetem Personal ergibt die Sattelanästhesie eine gefahrlose, befriedigende Schmerzbefreiung während der Entbindung.
3. Dass das volle Bewusstsein während der Entbindung erhalten bleibt, stellt vom psychologischen Standpunkt aus einen weiteren Vorteil dar.
4. Das Fehlen narkotischer Einflüsse auf den Fötus gehört zu den wertvollsten Vorzügen der Sattelanästhesie. Allgemeinnarkose sollte bei verfrühtem Einsetzen der Geburt nicht ankewandt werden.
5. Wenn die Sattelanästhesie zur Erzeugung von Schmerzlosigkeit während

der Entbindung angewandt wird, muss wegen der grösseren Häufigkeit operativen Eingreifens die Beherrschung geburtshilflicher Technik als unbedingte Voraussetzung gefordert werden.

6. Die folgenden Kontraindikationen der Sattelanästhesie müssen streng beachtet werden: (a) Infektion in der Gegend der Einspritzung; (b) neurologische Erkrankungen; (c) schwere Blutdrucksenkung; (d) Blutung; (e) ernster Widerstand der Mutter gegen Spinalanästhesie; (f) Allergie gegenüber dem zu verwendenden Mittel.

RÉSUMÈ

L'auteur donne ses conclusions pour 2,607 cas de rachi-anesthèsies pratiquées au service d'obstétrique du Pittsburgh Hospital. Il prétend que les obstétricens se servent de plus en plus de la rachianesthésie continue, procédé du blocage en selle. Ce procédé est plus apprécié des parturientes et rédit la narcose foetale.

Les contre-indications de ce procédé sont:

1. Une infection locale
2. Des lésions nerveuses
3. Une hypotension grave
4. L'héhorragie
5. Une appréhension naturelle à la rachianesthésie
6. Une allergie au médicament.

SUMARIO E CONCLUSOES

Uma serie de 2.607 bloquêios anestesicos num total de 6.788 parturientes observadas no "Pittsburgh Hospital" é apresentada mêste trabalho. Foram tiradas pelo autôr as seguintes conclusões:

1. A rapidez do parto é conduzida paralelamente a anestesia;

2. Um bloquêio anestesico conseguido com pessoal bem treindo, facilita bastante o relaxamento durante o parto;

3. O efeito psicologico beneficia grandemente a consciencia da parturiente durante o trabalho de parto, constituindo outra indicação;

4. A ausencia da narcose fetal, é uma das múltiplas vantagens do bloquêio anestesico. A anestesia geral, não deveria jamais sêr usada nos partos prematuros.

5. Se o bloquêio anestesico é feito para afastar a dôr durante o trabalho de parto, a necessidade de execução cirúrgica, casó venha se tornar evidente, será muito facilitada pelo processo já empregado;

6. As seguintes contra-indicaçoes para o bloquêio anestesico, devem sêr rigorosamente observadas: a) infecção na região onde se terá que injetar o anestesico; b) doenças nervosas; c) hipotensão pronunciada; d) hemorragia; e) rebeldia materna a raqui-analgesia, e f) alergia para o anestesico empregado.

RESUMEN Y CONCLUSIONES

Se presenta una serie de 2,607 bloqueos anestésicos en silla de montar en un total de 6,788 pacientes obstétricos del Hospital Pittsburgh. Se hacen las siguientes conclusiones:

1. La tendencia en obstetricia es hacia la anestesia por bloqueo regional.

2. La anestesia por bloqueo regional en silla de montar con un personal entrenado proporciona resultados satisfactorios durante el parto con seguridad.

3. El beneficio psicológico de conservar la conciencia durante el parto es un factor más.

4. La ausencia de narcosis fetal es una de las características más deseables de la anestesia por bloqueo regional en silla de montar. La anestesia general no debe ser usada en partos prematuros.

5. Si se sa la anestesia por bloqueo regional en silla de montar para la supresión del dolor durante el parto, el aumento de la intervención operatoria, requiere para seguridad habilidad en la técnica obstétrica.

6. Las siguientes contraindicaciones para el bloqueo anestésico en silla de montar deben de guardarse estrictamente: (a) infección en el sitio de la punción (b) enfermedad neurológica, (c) hipotensión grave, (d) hemorragia, (e) grave objeción materna a la anestesia espinal, y (f) alergia a la droga empleada.

REFERENCES

1. Merrill, R. B., and Hingson, R. A.: Study of Incidence of Maternal Mortality from Aspiration of Vomitus Occurring in Major Obstetric Hospitals in the United States, Current Research in Anesthesia and Analgesia 30:121-135 (May-June) 1951.

2. Cartwright, E. W.: Choice of Anesthesia for Normal Delivery, J.A.M.A. 145:1111-14 (April 14) 1951.

3. Parmley, C. C., and Adriani, J.: Saddle Block Anesthesia with Nupercaine in Obstetrics, Am. J. Obst. & Gynec. 52:636-640 (Oct.) 1946.

4. Kennedy, F.; Effron, A. S., and Perry, G.: Review of Literature for Cases of Grave Spinal Cord Paralysis Attributable to Spinal Anesthesia, Surg., Gynec. & Obst. 91:385 (Oct.) 1950.

5. Whitacre, R. J., and Cressman, P. A.: Choices of Anesthesia for Operative Vaginal and Abdominal Delivery, J.A.M.A. 145:1118-1122 (April 14) 1951. Rogers, W. C.: Spinal Anesthesia in More Than 5,000 Vaginal Deliveries, West. J. Surg. 56:236-242 (April) 1948. Rawlings Salford, E. E.: Low Spinal Anesthesia in Operative Obstetrics: A Further Series of 511 Cases, Brit. M. J. 1:412-14 (Feb. 18) 1950.

6. Greenhill, J. P.: Anesthesia in Obstetrics, Am. J. Obst. & Gynec. 54:74-81, 1947..

7. Greenhill, J. P.: 1951 Year Book of Obst. & Gynec., p. 145.

8. Schmitz, H., and others: Saddle Block Anesthesia, Am. J. Obst. & Gynec. 58:30-41, 1949.

9. McElraeth, P. J., and others: Continuous Spinal Anesthesia in Treatment of Severe Pre-Eclampsia and Eclampsia, Am. J. Obst. & Gynec. 58:1084, 1949.

10. Weintraub, F., and others: Post Partum Headache after Low Spinal Anesthesia in Vaginal Delivery and Its Treatment, Am. J. Obst. & Gynec. 54:682-86, 1947.

11. Reich, A. A.: Paravertebral Lumbar Sympathetic Block in Labor: A Report on 500 Deliveries by a Fractional Procedure Producing Continuous Conduction Anesthesia, Am. J. Obst. & Gynec. 60:1199, 1951. Cartwright;[2] Whitacre and Cressman;[5a] Rawlings Salford.[5c]

The Eighteenth Annual Congress

of the

United States and Canadian Sections

International College of Surgeons

will be held at the

Waldorf-Astoria

New York City

September 13-17 Inclusive, 1953

Transverse Colostomy for Ulcerative Colitis

FREDERICK B. CAMPBELL, M.D., F.A.C.S., F.I.C.S.
AND
RALPH B. SAMSON, M.D.
KANSAS CITY, MISSOURI

MULTIPLE stage operations must be performed, as a necessity, in many cases of intractable nonspecific ulcerative colitis. Transverse colostomy is the ideal procedure in selected cases: (1) as the first stage of a graded procedure requiring total colectomy, or (2) as a permanent colostomy with left hemicolectomy.

The extreme variability of the disease makes standardization of treatment impossible. It is agreed that medical management should be continued as long as a state of remission can be maintained by therapy and as long as the patient can carry on a semblance of normal social and economic activity. The majority of these patients are treated in this manner, and only a minority become medically intractable. It is unfortunate that the intractability is often recognized late in the disease, and from this group of patients, critically ill and therapeutically stranded, the surgeon must begin his work of salvage.

The surgical management of ulcerative colitis in the past fifty years has undergone many changes. At the turn of the century enterostomy was performed for two purposes—to divert the fecal stream and as a means of treating the infected colon by irrigation.

Appendicostomy was advocated in 1895 by Keetly as a means of irrigation, but it was not until 1902 that Wier performed this operation for ulcerative colitis. Appendicostomy has several advantages: it is easily performed with minimal amounts of anesthesia, with little risk to the patient, and affords easy irrigation of the colon, which can even be carried out by the patient. It does not, however, allow absolute rest of the colon.

Yeomans in 1946 advocated the use of appendicostomy with local irrigation of the colon with sulfasuxadine and made a plea for its use as the initial measure when surgical intervention is indicated. A partial review of the literature reveals insufficient reports concerning investigation of this method, and it is possible that further experience would show appendicostomy and local sulfonamide, plus antibiotics, to have sufficient merit to warrant its use early in the course of ulcerative colitis.

In 1900 Bolton performed the first cecostomy as a means of treating ulcerative colitis. This operation has been performed as a valvular or an open type. Its advantages and disadvantages are practically the same as those of appendicostomy, with the added problem of caring for the drainage, particularly if the open operation is employed.

Tine of Geneva, in 1797, first performed transverse colostomy accidentally, and Shitzinger, in 1881, was the first to divide the exteriorized bowel completely. Since then the procedure has been used extensivly as an easy means of diverting the fecal stream temporarily or permanently.

Ileostomy was only rarely performed prior to 1910 but was rather frequently utilized in the '20's. However, it carried with it a high mortality rate—25 to 83 per cent, as reported by various investigators. Recently the mortality rate of ileostomy has been found to vary between 14 and 30 per cent, although Calcock has reported a mortality rate of only 5.6 per

Read at the Reunion of the French Section, International College of Surgeons, Bordeaux, May 14, 1952.
Submitted for publication Aug. 10, 1952.

cent from this operative procedure in a series of 97 cases.

Ileostomy is theroetically an ideal operation for intractable ulcerative colitis. Diversion of the fecal stream puts the entire diseased portion of the bowel at rest, eliminates toxic absorption from this segment and minimizes the loss of blood plasma from ulcerated surfaces, but this has proved inadequate.

It is realized that primary colectomy is the treatment of choice for the patient whose general condition is satisfactory. It has been our experience, however, that patients in a state of remission and good general nutrition do not elect surgical treatment. Knowing the whims of ulcerative colitis, we infrequently urge ileostomy early in the course of the disease. Acute exacerbations occur, and as a result we have, as candidates for operation, patients who can expect no further benefit from medical treatment, who show the extreme general debility associated with fulminating ulcerative colitis and for whom surgical intervention is urgent.

Ileostomy performed on such a patient, with electrolyte imbalance, protein deficiency, anemia and avitaminosis, is a formidable procedure. At this time the cecum becomes a highly important organ in maintaining fluid and electrolyte balance, and its preservation, if at all possible even temporarily, is highly desirable.

Transverse colostomy, temporary or permanent, preserves the important absorptive function of the cecum at this critical time, and for this reason is the surgical procedure of choice in many cases.

We do not hesitate to perform a colostomy even when the serosal vessels are moderately injected and enlarged lymph nodes are present in the mesentery. Serosal exudate and rigidity of the bowel wall due to edema are definite contraindications to colostomy.

Transverse colostomy is indicated for two types of colitis in which there is moderate involvement, or none, of the right transverse colon or the cecum. 1. Acute fulminating colitis which does not respond to medical management. When the progressive course of the disease is apparently irreversible in the presence of impending perforation, massive hemorrhage, hyperpyrexia or excessive general debility, our experience has shown transverse colostomy to be the safest initial operation. It may be a life-saving emergency procedure for patients too ill even for left coloproctectomy until a later date. 2. chronic intractable colitis: In patients with this condition there is a fairly even balance between the disease and the patient. Acute exacerbations may be activated by some slight factor, such as emotional stress, dietary indiscretion or intercurrent infection. When normal social life and economic independence are seriously impaired by frequent exacerbations, surgical intervention is indicated. Transverse colostomy is frequently the only surgical procedure necessary to turn the balance permanently in favor of the patient.

The maximum pathologic changes associated with this chronic condition occur in the rectum and sigmoid and when perirectal abscess, multiple fistula, incontinence or stricture resulting in obstruction contribute to the intractability. Right transverse colostomy with left coloproctectomy is the operative procedure of choice.

For critically ill patients requiring emergency treatment but able to withstand only minimal procedures, in whose cases the level of involvement is unknown, we explore the abdomen through a short right upper rectus incision. The proximal limb of the divided colon is then brought out through this incision, if colostomy is elected, and is anchored in this position by a Daniel clamp with a catheter passed through it up to the ascending colon. The distal limb of divided colon is brought through a stab wound in the left rectus muscle. If colostomy is not feasible, the distal portion of the ileum is brought out through this incision and the proximal portion is brought out at a (lower) point satisfactory for permanent ileostomy. Otherwise, the right lower adbominal quadrant is reserved without scar for future ileostomy.

Transverse colostomy is not proposed a

the final surgical procedure necessary in all cases of chronic ulcerative proctosigmoiditis. However, diverting the fecal stream from the distal half of the colon may reverse the course of the disease in the proximal portion. Should there be an exacerbation of proximal colitis, right hemicolectomy with ileostomy is immediately advised and usually accepted readily by the patient. In each of our 14 cases there was immediate postoperative improvement without the problem of electrolyte and fluid loss encountered with ileostomy. These patients all had a completely uneventful convalesence, and there was no surgical mortality.

It is realized that 14 cases are too small a group to be statistically important. It is our firm conviction, however, that 4 or more of these patients who were critically ill would not have survived a primary ileostomy.

The physiologic processes in the intestine seemingly change after transverse colostomy, and if ileostomy is performed after a colostomy has been present for several weeks we do not encounter the acute electrolyte and water imbalance that occurs when ileostomy is the first surgical procedure.

SUMMARY

A brief historical review is given of the initial surgical procedures utilized in the treatment of intractable idiopathic ulcerative colitis.

Ileostomy carries high mortality rate when performed as the primary surgical procedure for ulcerative colitis. This mortality rate can be reduced by transverse colostomy, which preserves the absorptive function of the cecum and minimizes the fluid and electrolyte loss.

Transverse colostomy is the procedure of choice as the initial surgical measure in (a) acute fulminating intractable proctosigmoiditis and (b) chronic incapacitating proctosigmoiditis complicated by perirectal abscess, multiple fistula, incontinence or stricture resulting in obstruction. Transverse colostomy with or without left hemicolectomy is the only surgical procedure necessary for these conditions.

Primary colectomy is the treatment of choice for the patient in a satisfactory state of remission.

The results in 14 cases of proctosigmoiditis treated by transverse colostomy as the initial surgical measure are given.

RESUMEN

Se expone una breve revisión histórica sobre los procedimientos quirúrgicos iniciales, utilizados en el tratamiento de la colítis ulcerativa idiopática resistente.

La ileostomía tiene gran incidencia de mortalidad cuando se realiza como procedimiento quirúrgico primario para la colítis ulcerativa. Esta incidencia de mortalidad puede reducirse por colostomía del transverso, que conserva la absorción del ciego y disminuye la pérdida de líquidos y electrolítos.

La colostomía del transverso es el procedimiento de elección como medida quirúrgica inicial en: (a) la proctosigmoiditis intratable, aguda y fulminante, y (b) en la proctosigmoiditis incapacitadora, crónica y complicada por abceso perirectal, fístulas múltiples, incontinencia ó estenosis que produce obstrucción. La colostomía del transverso con ó sin hemicolectomía izquierda es el único procedimiento quirúrgico necesario para estos padecimientos.

La colectomía primaria es el tratamiento de elección para el paciente en un estado de remisión satisfactoria.

Se dan los resultados de 14 casos de proctosigmoiditis tratados por colostomía del transverso como procedimiento quirúrgico inicial.

SUMARIO

Um revisão historica é apresentada pelo autôr, acêrca dos processos cirurgicos inicialmente utilizados para tratamento da colite ulcerosa idiopática rebelde.

A ileostomia ocasiona uma porcentagem elevada de mortalidade, quando utilizada como processo cirúrgico inicial na colite

ulcerosa. Essa cifra de mortalidade pode sêr reduzida pela colostomia do transverso, o que preserva a função de absorção do cego e diminue a desidratação e perdas electroliticas dos doentes.

A colostomia do transverso é um processo de eleição para sêr empregado pelos cirurgiões nas procto-sigmoidites agudas, fulminantes e rebeldes, e bem assim nas procto-sigmoidites complicadas de abcesso peri-retal, fistulas múltiplas, incontinencia, ou ainda nas obstruções resultantes por contrações. A colostomia do transverso, com ou sem a hemicolectomia esquerda, é o unico processo aconselhavel nêsses casos.

A colectomia primaria é o tratamento de escôlha para os doentes em bôas condições fiscicas.

Os resultados de 14 doentes portadôres de procto-sigmoidite tratados inicialmente pelo processo cirúrgico discutido, são apresentados pelo autôr.

RÉSUMÈ

Voici un bref exposé du traitement chirurgical de la colite ulcéreuse. L'iléostomie comporte un taux de mortalité élevée comme traitement initial. Cette mortalité peut s'abaisser par la colostomie transverse. Ce procédé chirurgical est idéal pour (a) une procto-sigmoïdite aigue, or (b) une proctosigmoïdite chronique compliquée. L'auteur donne ses résultats dans 14 cas.

ZUSAMMENFASSUNG

Es wird ein kurzer geschichtlicher Ueberblick über diejenigen chirurgischen Massnahmen gegeben, die als erste Eingriffe in der Behandlung widerspenstiger Fälle von idiopathischer ulzerativer Kolitis angewandt worden sind.

Die Ileostomie weist als anfänglicher chirurgischer Eingriff in Fällen von ulzerativer Kolitis eine hohe Sterblichkeitsziffer auf. Durch Anwendung der Kolostomie am Querdarm anstelle der Ileostomie kann die Mortalität herabgesetzt werden; die Kolostomie erhält die absorptive Leistung des Zökums und beschränkt den Verlust von Flüssigkeiten und Elektrolyte auf ein Minimum.

Die Kolostomie des Querdarms ist al anfängliche chirurgische Massnahme di Methode der Wahl in Fällen von (a) heftiger widerspenstiger akuter Proktosigmoiditis, und (b) chronischer invalidisierende Proktosigmoiditis, die durch perirektale Abszesse, Fistelbildungen, Inkontinenz, oder zum Darmverschluss führende Strikturen kompliziert ist. Diese Zustände bedürfen keines weiteren chirurgischen Eingriffs ausser der Kolostomie des Querdarms mit oder ohne Resektion der linken Dickdarmhälfte.

Die primäre Resektion des Dickdarms ist die Methode der Wahl zur Behandlung von Kranken, die sich in einem befriedigenden Zustand der Remission befinden.

Die Behandungsergebnisse in 14 Fällen von Proktosigmoiditis, bei denen als erste chirurgische Massnahme eine Kolostomie des Querdarms ausgeführt wurde, werden vorgelegt.

RIASSUNTO

Viene brevemente tratteggiata la storia dei primi tentativi chirurgici nella cura della colite ulcerosa idiopatica ribelle.

L'ileostomia è gravata da un alta mortalità operatoria quando viene eseguita come primo intervento. La mortalità può essere diminuita mediante una colostomia sul trasverso, che rispetta la funzione di assorbimento del ceco e riduce al minimo le perdite dei liquidi e dei sali.

La colostomia sul trasverso è il metodo di scelta come terapia di inizio nei casi (1) di proctosigmoidite acuta fulminante incurabile, e (2) di proctosigmoidite cronica complicata da ascessi perirettali, fistole multiple, incontinenza o stenosi ostruente. La colostomia sul trasverso con o senza emicolectomia sinistra, è l'unico metodo utile.

La colectomia primaria è il metodo di scelta nei casi che si trovino in periodo di remissione e in condizioni soddisfacenti.

Vengono presentati i risultati ottenuti in 14 casi di proctosigmoidite curati con colostomia sul trasverso come tempo preliminare.

BIBLIOGRAPHY

Ferguson, L. K., and Welty, R. F.: The Surgical Management of Ulcerative Colitis, S. Clin. North America 27:1427-1434, 1947.

Corbett, R. S.: A Review of the Surgical Treatment of Chronic Ulcerative Colitis, Proc. Roy. Soc. Med. 38:277, 1945.

Brown, C. H., and Gleckler, W. J.: Surgical Treatment of Chronic Non-specific Ulcerative Colitis, Gastroenterol. 14:465, 1950.

Walcock, B. P.: Surgical Treatment of Ulcerative Colitis, New England J. Med. 242:320, 1950.

Youman, F. C.: Appendicostomy in Ulcerative Colitis, New York State M. J. 46:2269-2271, 1946.

Bacon, H. E., and Trimpi, H. D.: The Selection of an Operative Procedure for patients with Medically Intractable Ulcerative Colitis, Surg. Gynec. & Obst. 91:409-420, 1950.

Campbell, F. B.: Transverse Colostomy in Chronic Ulcerative Proctocolitis, Southern M. J. 42:435-439, 1949.

Spivack, J. L.: The Surgical Technique of Abdominal Operations. The Canterbury Press, 1942.

1953 MEETINGS OF THE INTERNATIONAL COLLEGE OF SURGEONS

REGIONAL DIVISION MEETINGS, UNITED STATES SECTION

ILLINOIS DIVISION, Congress Hotel, Chicago, May 5-6. Dr. Karl A. Meyer, 30 N. Michigan Avenue, Chicago 2, Illinois, Chairman.

EIGHTEENTH NATIONAL ASSEMBLY, UNITED STATES SECTION, Waldorf-Astoria Hotel, New York City, September 13-17. Dr. Horace E. Ayers, 75 Central Park West, New York 23, Chairman.

INTERNATIONAL MEETINGS*

ITALIAN SECTION, University of Rome, Italy, June 11, 12 and 13. Professor Raffaele Paolucci, Via a Guattani 8, Rome, Italy, Chairman.

SECOND ASSEMBLY BRAZILIAN SECTION AND FIRST PAN AMERICAN CONGRESS, Curitiba, Parana, Brazil, October 5-9. Professor Rudolpho Freitas and Dr. Waldyr Silva Prado, Rua Cesareo Motta 112, Sao Paulo, Brazil, Chairmen.

EIGHTEENTH ANNUAL CONGRESS

United States and Canadian Sections

NEW YORK, WALDORF ASTORIA HOTEL, September 13-17. Dr. Horace Ayers, F.A.C.S., F.I.C.S., General Chairman. For full information address:
Secretariat of the International College of Surgeons
1516 Lake Shore Drive
Chicago, Illinois

*For detailed information write to the Secretariat, 1516 Lake Shore Drive, Chicago 10, Illinois.

Neonatal Bleeding and Cerebral Birth Palsy

SAMUEL ROSNER, M.D., F.I.C.S.
NEW YORK, N. Y.

IT is necessary at the outset of this paper to define cerebral birth palsy. Cerebral birth palsy is nonfamilial paralysis or paresis of one or more limbs. The type may be spastic, rigid or choreiform athetotic, with or without mental deficiency manifesting itself early in life, usually toward the end of the first year after birth.

Denis,[1] Billard[2] and Cruveilhier[3] published several papers intimating that intracranial hemorrhage at birth and the later development of cerebral spastic paralysis were intimately connected. These papers appeared in France between 1826 and 1835.

In 1843, Little[4a] of London stated that difficulty of labor may be a causative factor. However, in 1862 he published a second monograph on the subject,[4b] stating that, as a result of further investigation of a large series of postmortem examinations, he was of the opinion that cerebral spastic paralysis was due to intracranial hemorrhage at the time of birth in almost 75 per cent of cases. In 1885, Sarah McNutt[5] confirmed this opinion by careful study of pathologic specimens. Beneke,[6] Pott,[7] Mayer,[8] Holland,[9] Schaefer,[10] Schwartz,[11] Saenger,[12] Capon,[13] Barnett,[14] and others have contributed valuable postmortem observations. Fischer[15] of Basel wrote that his postmortem observations at the Institute have convinced him that "the 10% of deaths during the first month of life are chiefly due to cerebral birth injuries." Huenekens,[16] in an article published in 1924, maintained that "the recognition of cerebral hemorrhage of newborn is a most neglected phase in their care and yet is a most important one."

The monumental work of William Sharpe[17] on cerebral spastic palsy should be brought to the attention of the medical profession. What follows is, in great part, adapted from his writings on the subject.

William Sharpe, over a period of fifteen years, investigated a large number of cases of acute extensive intracranial hemorrhage in the newborn and a large group of children with varying degrees of spastic paralysis and mental retardation. The hemorrhages in the newborn were confirmed by lumbar puncture, cranial operation and necropsy. In selected cases of the chronic type the diagnosis of former intracranial hemorrhage, most probably occurring at the time of birth, was confirmed by operative and postmortem observations.

Dr. Sharpe was so impressed by these data that he advised a lumbar puncture within twelve to twenty-four hours after birth. This was tried on a first series of 100 consecutive newborn babies as an accurate means of diagnosing the acute condition.

Intracranial hemorrhage of the newborn is of three types:

1. Massive hemorrhage, which manifests itself by stupor, respiratory difficulties, refusal or inability to feed, muscular twitching or convulsions. Without operative intervention, the children die.

2. Mild intracranial hemorrhage—i. e., a degree of loss than can be entirely absorbed. The acute signs, if any, are temporary, and the child makes an excellent recovery. If anything abnormal is noted during the period of absorption, it is usually soon forgotten.

3. Hemorrhage involving loss of an insufficient quantity of blood to cause death yet too much blood to be absorbed entirely. Babies with this type are the ones who only apparently recover within two to four weeks. They are sometimes considered normal for a number of months. Within a year, however, it is noted that the child

Submitted for publication Dec. 11, 1952.

is not developing physically at the normal rate. It is retarded in sitting, in holding the head up and later in walking and talking. Within the last few months of the first year a spastic condition of one or more limbs is noted. Diplegia, hemiplegia or paraplegia, with or without mental defect, is later noted.

William Sharpe's[17] observations and data on lumbar puncture in 500 consecutive cases were as follows:

Of the first 100 newborn babies upon whom a lumbar puncture was performed within the first twenty-four hours after birth, the cerebrospinal fluid was bloody in 4 and blood-tinged in 5. A total of 9 per cent, therefore, showed some degree of contamination with blood. The cerebrospinal pressure varied. Multiple lumbar punctures were needed in some cases to get clear fluid under normal pressure. Two of these 9 babies died. At postmortem examination, 1 was found to have a large ventricular hemorrhage and the second showed mild subarachnoid hemorrhage with extensive cerebral edema. In the remaining 7 cases, repeated spinal punctures, at twenty-four-hour intervals, resulted in clear fluid under normal pressure.

It is interesting to note that no instruments had been used in these 9 cases. In 10 cases of this series low forceps had been used but no intracranial hemorrhage had occurred. The cord Wassermann reaction was negative in each case. In 2 cases jaundice was reported. One baby had convulsive twitchings which came on ten hours after birth. The twitchings disappeared six hours after lumbar puncture. The cerebrospinal fluid in this case was clear. In 8 cases a "dry tap" was recorded.

In the second series of 100 consecutive newborn babies, bloody spinal fluid of varying degree was observed in 13, or 13 per cent. Nine showed frank blood; in 3 the fluid was blood tinged and in 1 it was yellow, containing many red blood cells. There were no deaths in this series. The intracranial pressure at lumbar puncture ranged from normal to 26 mm. of mercury. The largests number of punctures needed was 5. Two babies showed cyanosis and muscular twitchings, which stopped six hours after lumbar puncture. Marked stupor, convulsions or refusal to nurse were not present in any of the cases. Labor in the 13 cases was normal. The coagulation time of the blood was normal in all 13. One baby, whose condition had been diagnosed as hemorrhagic disease of the newborn, did not have an intracranial hemorrhage. Ten babies were of syphilitic mothers, and in 2 of them the cerebrospinal fluid was bloody. In 6 cases a "dry tap" was recorded.

In the third series of 100 consecutive newborn babies, bloody cerebrospinal fluid was observed in 10 (10 per cent). There Frank blood appeared in 4 and yellow fluid with many red blood cells in 6. Six was the highest number of lumbar punctures necessary to obtain clear cerebrospinal fluid under normal pressure. There were no deaths in this series. Seven babies, born of syphilitic mothers, all had clear cerebrospinal fluid, and forceps were applied in 9 cases. Two babies from midforceps deliveries showed frank blood in 1 case and blood-tinged fluid in the second. In the 7 cases of low forceps delivery, only 1 baby had free blood in the cerebrospinal fluid. The intracranial pressure ranged from 3 to 15 mm. of mercury, and the anterior fontanel was not a reliable indicator of intracranial pressure. The blood coagulation time was not lengthened in any of the cases in which there was blood and in only 1 of those in which there was yellow fluid. In 6 cases a "dry tap" was recorded. Four babies became jaundiced between the second and the seventh day after birth. However, they showed clear cerebrospinal fluid within twenty-seven hours of birth.

In the fourth series of 100 consecutive newborn babies, the cerebrospinal fluid was bloody in 4 and straw-colored in 3, a total of 7 per cent. One baby died, and postmortem examination showed extensive intraventricular, basilar and supracortical hemorrhage. In this baby, lumbar puncture revealed bloody fluid under pressure of 10 mm. of mercury. Fourteen hours

after birth generalized convulsions came on, and death followed shortly thereafter. Jaundice was present in 4 babies, in 3 of whom the cerebrospinal fluid was clear and in 1 yellow with numerous red blood cells. In this baby the first lumbar puncture, fourteen and one-half hours after birth, showed clear fluid under normal pressure. The jaundice appeared on the seventh day. Clotting time was within normal limits both before and after the onset of jaundice.

There was no predominance of sex in any of the series. About 50 per cent were firstborn babies. Muscular twitchings of the face and extremities and convulsive seizures were observed in 5, in 2 of whom the cerebrospinal fluid was bloody. One baby nursed poorly, and the spinal fluid in this case was yellow with many red blood cells. Cyanosis was observed, in 1 baby who had clear fluid under normal pressure. In 32 cases in which there was a rise in intracranial pressure, the cerebrospinal fluid was bloody or yellow in 6. Seven premature babies were not treated by lumbar puncture. In 5 cases the spinal canal could not be entered. Contamination of fluid by trauma occurred in 2 cases.

Eighty-one babies showed normal blood clotting time. Seven of these showed hemorrhagic fluid. The anterior fontanel was flush in 38, and of these 4 had hemorrhagic fluid. In 14 cases of bulging fontanel the spinal fluid was clear. In 39 cases the fontanel was depressed, and in 3 of these there was hemorrhagic fluid. The status of the fontanel was not recorded in 9 instances. Seven of 9 premature babies were not subjected to lumbar puncture on account of their low vitality. Three of these babies died, and necropsy revealed no intracranial hemorrhage. Low forceps delivery was used in 10 cases; 1 of the babies had bloody cerebrospinal fluid. In 2 cases labor was prolonged, and 1 of the babies had blood-tinged fluid. There was 1 dry labor, 1 cesarean section, 1 frank breech delivery and 1 induced labor; all of the babies had clear fluids. In 1 case there were convulsions, and 4 lumbar punctures were performed before the intracranial pressure was normal and the convulsions stopped. Each lumbar puncture showed the spinal fluid to be normal. In 5 cases a "dry tap" was recorded.

In the fifth series of 100 consecutive newborn babies the cerebrospinal fluid was bloody or blood-tinged in 6 cases. The mothers in 3 of the cases in which blood appeared were primiparae. All 6 babies were boys; 5 were white and 1 was a Negro. Two of these were premature. One breech and one low forceps delivery were included. No definite signs of bloody fluid were observed in these cases, and the condition would have been overlooked had not lumbar puncture been performed. The coagulation time of the blood was within normal limits in all 6 cases. The fontanels were bulging in 2, flush in 3 and depressed in 1. The intracranial pressure was normal in 2, elevated in 3, and below normal in 1 (in which the birth was premature). In 9 cases a "dry tap" was recorded; 2 babies were in shock and not tapped, and 5 died before lumbar puncture could be performed.

Résumé. — Sharpe's summary of the foregoing series of 500 consecutive cases in which newborn babies were subjected to lumbar puncture was performed within twelve to twenty-four hours after birth contains the following data:

1. In 45 babies, or 9 per cent, there was bloody or blood-tinged spinal fluid. Of these, 33 were boys, 22 were first born children and only 4 were premature.

2. One baby, who died before lumbar puncture could be performed, showed extensive intracranial hemorrhage with bloody spinal fluid at postmortem tap. The case of this child was not included in the series.

3. Fifty babies (10 per cent) were not treated by lumbar puncture. In 36 instances a "dry tap" was recorded, and in 14 the test was not performed, as 7 babies were premature and in poor condition and 7 were in shock.

4. In the cases in which bloody fluid was present, another tap was done immediately in the interspace above to confirm or dis-

prove the presence of blood observed at the first lumbar puncture.

5. In the cases in which blood was present, daily taps were done until the fluid was clear and the pressure normal. As many as 7 punctures were necessary in several cases. The average number was slightly over 3.

6. There were 3 deaths in the series—2 in the first hundred and 1 in the fourth. The causes included—1 large intraventricular hemorrhage, 1 large supracortical, basilar and subtenticular hemorrhage and spinal hemorrhage. The common signs were stupor and refusal to nurse. Convulsions occurred only in the third baby.

7. Seventeen babies became jaundiced, but in only 2 was the cerebrospinal fluid bloody. The blood clotting time was normal in both cases.

8. The Wassermann reaction was positive in both mother and child in only 1 case of bloody spinal fluid. It was 4 plus in 2 mothers but negative in their babies; 1 plus in 2 mothers but negative in the babies, and 1 plus in one baby but negative in the mother.

9. The clinical signs were meagre; in fact, as a rule they were absent. Seventy-five babies showed the following signs, in order of frequency:

a. Muscular twitches of hands and fingers (15 babies 5 of whom showed bloody fluid).

b. Muscular twitchings of the feet and toes in 11 babies, of whom only 4 had bloody fluid.

c. Prolonged cyanosis in 9 babies, 2 of whom showed bloody fluid.

d. Poor nursing by 7 babies, of whom 2 had blood in the spinal fluid.

e. Unusual drowsiness in 4 babies, 2 of whom had blood in the spinal fluid.

f. Rigidity in 2 babies both of whom had blood in the cerebrospinal fluid.

g. Respiratory difficulties of mild degree were in 14 babies, of whom only 2 had bloody fluid.

h. Frothing at the mouth in 1 baby who had bloody fluid.

i. Supranuclear facial palsy in 1 baby who had bloody fluid and epistaxis in 2, of whom one had bloody spinal fluid.

j. Of 75 babies in whose cases there were clinical signs suggestive of possible intracranial lesion, only 25 had blood in the cerebrospinal fluid and the status of 8 was not recorded. The intracranial pressure in these 75 cases was normal in 28, diminished in 16 and increased in 31. The anterior fontanel was flush in 24, bulging in 15 and depressed in 25. The blood clotting time was normal in 35, prolonged in 6 and decreased in 10. The blood Wassermann test of the mother elicited a positive reaction in 6.

10. Labor was normal L. O. A. and R. O. A. in 24 cases, prolonged in 7 and precipitate in 3. Low forceps delivery was employed in 3, 1 of which was a case of prolonged labor; medium forceps in 4; breech extraction in 2; version with breech extraction in 1, and facial presentation in 1. (total, 45).

11. The fontanels in the 45 cases of bloody cerebrospinal fluid showed tense and bulging fontanels in 11, depressed fontanels in 14 and flush in fontanels in 20.

12. Spinal fluid in the 45 cases was bloody in 22, blood-tinged in 9 and yellow in 14 (total, 45).

13. The blood clotting time was normal in all of the 45 babies who showed blood in the spinal fluid.

14. The intradural pressure in these 45 cases, in millimeters of mercury, ranged from 2 to 3 mm., 1; 4 mm., 7; 14 mm., 3; 15 mm., 1; 16 mm., 2; 18 mm., 1, and 26 mm., 1.

"The fact that the blood clotting time was normal in the 45 cases," says Dr. Sharpe, "cannot be considered of great significance since within the first 3 days it can be normal even in hemorrhagic disease of the newborn."

Chronic Brain Injuries in Children.—Dr. William Sharpe, up to Jan. 1, 1923, examined 5,327 children with various degrees of cerebral spastic paralysis. *The following facts were brought forward*:

1. Of the total series, 0.69 per cent (⅔ of 1 per cent) of the patients showed spyhilis. The blood and spinal fluid were

examined in both patients and parents.

2. One of the most common lesions of the brain producing spastic paralysis is intracranial hemorrhage of the newborn. This is due to venous bleeding, bleeding from a sinus, or bleeding from sinus tributaries. High forceps and prolonged labor cause venous stasis asphyxia and venous tears. This results in blood clot over the cortex. In rare cases the clot may be cortical or subcortical. Usually damage to the cortical cells is due to direct pressure by the blood clot, and the resulting scar is due to organization of the clot. This also results in partial block of excretion of the cerebrospinal fluid. The clinical signs resulting from clot or scar tissue depend upon the situation of the lesion in relation to the pyramidal cortex or tracts.

3. The hemorrhage is usually over one side of the brain; therefore, the affected function is usually unilateral.

4. In cases of mild involvement the clot may be absorbed completely, with little or no resulting pathologic change. However, epilepsy may develop later in such cases, or other signs of cortical irritability or instability may appear.

5. Intracranial hemorrhage not related to the pyramidal tracts may effect the sensory or mental function of the patient.

6. Royle and Hunter suggested sympathetic ramisectomy to combat spasticity. Dr. Sharpe tried this method of attack in 9 cases, with no permanent lessening of the spasticity.

7. There being no increased intracranial pressure, operation was of no avail when the condition was due to lack of development of the cortex or its pyramidal tracts or when there was permanent damage due to meningoencephalitis. This applies to microcephalus as well.

8. Until Jan. 1, 1923, of the 5,192 cerebrospastic children examined in the Sharpe Clinic, only 671 showed definite signs of intracranial pressure. Therefore, in only about 12 plus per cent of cases was the condition considered due to intracranial hemorrhage and possibly amenable to surgical treatment. Intracranial pressure was ascertained by lumbar puncture with manometric and ophthalmoscopic examination.

9. There may be cases in which the incomplete absorption of blood is sufficient to cause no rise of intracranial pressure.

10. Meningoencephalitis may result in convulsions or intracranial pressure due to a mild condition of external hydrocephalus. This is due to partial blockage by adhesions accompanying the meningoencephalitic condition.

11. Of the 5,192 patients, 2,734 showed lack of development of cortical or pyramidal tracts. Of these 2,734 only 792 were not premature babies and only 503 were not born after a large number of pregnancies. That is, impairement of nerve tissue was due to insufficient time for development or to the less active growth of the nerve cells that occurs in children after a large number of pregnancies when the mothers are malnourished.

12. In 1,787 cases the condition was attributed to former meningoencephaltis or meningitis. There was a history of high temperature in 1,328 cases, with accompanying convulsions in 1,206. In most cases the children were normal until the onset of acute illness with high temperature. Convulsions persisted in 1,124 of the children, and all of them were very unstable emotionally.

13. Postmortem examination of patients with cerebral spastic paralysis, according to institutional records, has indicated that in two-thirds of the cases the condition is due to intracranial hemorrhage.

14. Operation is reserved for cases in which cerebrospastic paralysis is due to intracranial pressure, whether or not associated with mental defect. In no case of mental defect without raised intracranial pressure should operation be performed, and naturally no child whose condition is due to lack of development of the nervous system should undergo surgical treatment.

15. *Treatments*: As to treatment and its results, repeated lumbar punctures, in babies under 10 days of age with fluid hemorrhage give uniformly good results. In cases of large hemorrhage or clotted

blood, operative attack will remove the clot and reduce intracranial pressure. For more advanced conditions the scar, cyst or fibrous mass may sometimes be removed with benefit.

Cranial decompression and drainage was carried out by Dr. William Sharpe on 654 children up to Jan. 1, 1923, with a total mortality rate of 69, a little over 10 per cent. Nine of 13 children who underwent operation on the first day of life are apparently normal in every way. Seven babies so treated on the second day and 5 whose operations were performed in the fifth day all lived. Diagnosis and treatment at this early date give the best results. It must be remembered that the optic discs will not usually show signs of pressure at this stage.

Of 654 surgically treated patients, 81 per cent were first children; 95 per cent were full-term children; 90 per cent were born with difficulty, and 27 per cent had convulsive twitchings immediately after birth. In 87 per cent of the patients operated on, spasticity was noted within the first year of life—usually in the seventh, eighth or ninth, month.

Of the 654 surgically treated patients, 319 were hemiplegic, 92 paraplegic and 243 diplegic.

The average age of the first 65 operative patients was 6 years. These showed extreme involvement; most of them had never walked or talked. "Even in some of the older cases there was striking improvement." Nine children, each of them over 8 years of age at the time of the operation, are now walking.

In the younger children the results were "most gratifying," and the Sharpes expressed the opinion that the best results are obtained in children under 3 years of age. In patients at this level, both the spastic and the mental condition showed definite improvement.

"Physical after-training" plays an important part in securing maximal improvement.

Written permission for necropsy was obtained in each case before the operation. The brain of each of the 69 patients who died was examined. In 64 cases the diagnosis of intracranial hemorrhage was confirmed. In the remaining 5 cases, 2 patients showed edematous brains under excessive pressure, associated with enlargement of the thymus. The other 3 showed edema of the brain with numerous adhesions overlying convolutions, sulci and cerebral vessels—similar to the organization residue of former meningitis.

In a large number of cases moving pictures were taken before the operation and then at intervals of six months after the operation. In this manner the lessened spasticity and the resulting improvement in gait have been accurately demonstrated and recorded.

The Binet mental tests were used both before the operation and at regular intervals of six months after the operation. The mental improvement of many of these children has been most impressive.

SUMMARY AND CONCLUSIONS

1. Intracranial hemorrhage at the time of birth occurred in 9 per cent of the Sharpes series of 500 consecutive infants undergoing lumbar puncture in the first twenty-four hours of life.

2. Sharpe noted that the most common signs of intracranial hemorrhage in the newborn are drowsiness (to stupor), difficulty in nursing or refusal to nurse, muscular twitches, convulsive seizures, rigidity and cyanosis.

3. Firstborn, full term boys born in prolonged difficult labors, "middle forceps cases" "breech cases" show greater risk in neonatal intracranial hemorrhage.

4. Hemorrhagic disease of the newborn and syphilis in parents or child are not prevalent factors in neonatal intracranial hemorrhage.

5. Lumbar puncture as an early diagnostic method, when hemorrhage is still fluid, is a simple and safe procedure in the absence of severe shock.

6. The early recognition and appropriate treatment of acute intracranial hemorrhage in the newborn may lessen the large group of physically and mentally impaired

children whose disabilities are chronic.

7. Sharpe examined 5,192 cerebrospastic children up to Jan. 1, 1923. Of these 671 showed definite signs of raised intracranial pressure (about 12 per cent).

8. Six hundred and fifty-four of these children were operated upon, and evidence of intracranial bleeding, probably at birth, was confirmed. Moving pictures were taken before and after the operation. The improvement after the operation was striking in children up to the age of 3 years and occasionally in those up to 10.

9. Of 5,192 patients, 1,787 had had an acute illness associated with high fever. In these cases the condition was diagnosed as due to meningitis or meningoencephalitis. Of these patients 1,685 showed convulsive seizures at the time of acute illness. These may be amenable to surgical treatment (removal of scar tissue and decompression of the edematous brain).

10. There were 69 deaths in the series, and neonatal intracranial hemorrhage was confirmed in 67 of the necropsies. Severe cerebral edema was observed in the remaining 2 cases.

11. Mr. Little, in his second monograph on cerebral spastic palsy, in 1862, expressed the opinion that in almost 70 per cent of these cases intracranial hemorrhage was the cause. Sharpe was convinced that cerebral spastic palsy was due to intracranial hemorrhage in about 70 per cent of cases.

After analyzing the mass of overwhelming information put forth by Sharpe, one can come to certain definite conclusions:

1. Neonatal intracranial hemorrhage is a potent cause of cerebral spastic paralysis.

2. Lumbar punctures for spinal drainage in the presence of acute fluid intracranial hemorrhage are adequate means of attack in most cases. Unilateral or bilateral removal of clots, cysts or adhesions by craniotomy and a permanent lessening of the intracranial pressure is a potent mode of treatment for the chronic condition if done before the patient is 6 years old.

There is no doubt in my mind that Dr. Sharpe has done a great service to mankind in carrying out his monumental task and that all physicians can do their share by following the principles of diagnosis and treatment that he and his co-workers have set forth.

RESUMEN Y CONCLUSIONES

1. Durante el momento del nacimiento se produjo hemorragia cerebral en el 9 por ciento de una serie de 500 niños, sometidos a punción lumbar en las primeras veinticuatro horas de vida.

2. Sharpe observó que los signos más comunes de hemorragia intracraneal del recién nacido son: dificultad ó resistencia para el cuidado, contracciones musculares, ataques convulsivos rigidez y cianosis.

3. Los primogénitos a término con partos difíciles y prolongados, los casos de fórceps medio, las presentaciones pélvicas, muestran mayor riesgo para la hemorragia intracraneal del recién nacido.

4. Las enfermedades hemorrágicas del recién nacido y la sífilis de los padres ó del niño, no son factores prevalecientes en la hemorragia intracraneal del recién nacido.

5. La punción lumbar es un medio para el diagnóstico precoz, cuando la hemorragia es todavía líquida, es un procedimiento sencillo y seguro en ausencia de choque grave.

6. El reconocimiento temprano y el tratamiento apropiado de la hemorragia intracraneal del recién nacido puede reducir el gran numero de niños incapacitados física y mentalmente en forma crónica.

7. Sharpe examinó 5,192 niños "cerebroespásticos" hasto el lo. de enero de 1923. De estos 671 mostraron signos definidos de aumento de la presión intracraneal, (12 por ciento aproximadamente).

8. Seiscientos ciacuenta y cuatro de estos niños fueron operados, habiéndose confirmado la evidencia de hemorragia intracraneal probablemente del nacimiento. Se filmaron películas antes y después de la operación. La mejoría después de la operación fué notable en niños hasta la edad

de 3 años y ocasional en aquellos de 10.

9. De 5,192 pacientes, 1,787 tuvieron algun padecimiento agudo asociado con fiebre alta. En estos casos el padecimiento fué diagnóstico como meningitis ó meningoencefalítis. De estos pacientes, 1,685 mostraron ataques convulsivos durante el padecimiento agudo. Estos estan obligados al tratamiento quirúrgico (extirpacion de la cicatriz y descompresión del edema cerebral).

10. En la serie hubo 69 muertes y la hemorragia intracraneal del recién nacido fué confirmada en 67 de las autopsias. En los 2 casos restantes se observó edema cerebral intenso.

11. Mr. Little en su segunda monografía sobre parálisis cerebral espástica, en 1862 expresó la opinión de que en casi el 70 por ciento de estos casos la causa fué hemorragia intracraneal. Sharpe tiene la convicción de que el 70 por ciento de los casos de parálisis cerebral espástica fueron debidos a hemorragia intracraneal.

Después de analizar el material abrumador de información dado por Sharpe, se obtienen ciertas conclusiones definídas.

1. La hemorragia intracraneal del recién nacido es una causa poderosa de parálisis cerebral espástica.

2. Las punciones lumbares para drenaje espinal en presencia de hemorragia intracraneal aguda líquida son medio adecuado para "el ataque" en la mayoría de los casos. La remoción de coagulos unilateral ó bilateral, la de quistes ó de adherencias por craniotomía y la disminución de la presión intracraneal elevada son medios poderosos de tratamiento para el padecimiento crónico si es efectuado anes de que el paciente tenga 6 años de edad.

No existe duda en mi mente, de que el Dr. Sharpe ha realizado un gran servicio a la humanidad al llevar a cabo su obra monumental, y de que todos los médicos pueden hacer su parte siguiendo los principios de diagnóstico y tratamiento qu él y sus colaboradores han establecido.

RIASSUNTO E CONCLUSIONI

1. Nella serie di Sharpe di 500 neonati sottoposti a puntura lombare nelle prime 24 ore di vita, l'emorragia intracranica al momento della nascita si verificò nel 9% dei casi.

2. Sharpe rilevò che i segni più comuni di emorragia intracranica nel neonato sono rappresentati da sonnolenza (fino allo stato stuporoso), difficoltà nell'alimentarsi o rifiuto degli alimenti, contrazioni muscolari, attacchi convulsivi, rigidità e cianosi.

3. Il maggior rischio di emorraggie intracraniche neonatali è presente nei priminati, nei neonati a termine dopo parto prolungato e difficile, nei casi di forcipe a media altezza, e nei casi di presentazione podalica.

4. Le malattie emorragiche del neonato e la sifilide dei genitori o del bambino non rappresentano fattori etiologici di importanza.

5. La puntura lombare è un metodo di diagnosi precoce, semplice e sicuro, qualora l'emorragia sia liquida e non vi siano segni di shock grave.

6. Il riconoscimento precoce e la terapia adatta possono diminuire notevolmente il numero di bambini deficienti fisicamente e mentalmente e la cui infermità sarà cronica.

7. Sharpe esaminò 5.192 bambini con affezioni cerebro-spastiche fino al 1° gennaio 1923. Circa il 12% di essi (671) mostrarono segni certi di ipertensione intracranica.

8. Di essi 654 furono operati e si ebbe la conferma che vi era stata una emorragia intracranica, probabilmente alla nascita. Si fecero dei film prima e dopo l'intervento; il miglioramento fu evidente in quelli che non avevano raggiunto i 3 anni di età eccezionale dai 3 ai 10 anni.

9. Su 5;192 pazienti, 1787 avevano avuto una malattia acuta febbrile. In questi casi si fece diagnosi di meningite o meningoencefalite.

Di costoro 1685 ebbero attacchi convulsivi durante l'affezione acuta. Questi casi sono suscettibili di cura chirurgica (asportazione di tessuto cicatriziale e decompressione dello encefalo edematoso).

10. Nella serie vi furono 69 morti; in

67 autopsie fu confermata la diagnosi di emorragia neonatale intracranica. Negli altri 2 casi vi era un grave edema cerebrale.

11. Nella sua seconda monografia sulla paralisi cerebrale spastica (1862) Little formulò l'opinione che in circa il 70% dei casi l'emorragia intracranica ne era la causa. Sharpe era persuaso che la paralisi cerebrale spastica era dovuta ad emorragia intracranica in circa il 70% dei casi.

Dopo una disamina delle numerose e decisive argomentazioni fornite da Sharpe si può giungere ad alcune conclusioni definitive:

1. L'emorragia intracranica dei neonati è una causa fondamentale della paralisi cerebrale spastica.

2. Le punture lombari per drenare il rachide, quando il sangue sia ancora liquido, rappresentano un mezzo adatto per una terapia di attacco in molti casi. L'asportazione uni- o bilaterale di coaguli, di cisti o di aderenze, per mezzo di craniotomia e un abbassamento permanente dell'ipertensione intracranica, rappresentano una terapia efficacissima nelle forme croniche, purchè attuate prima dei 6 anni di età.

Non vi è dubbio, a parer mio, che Sharpe abbia reso un grande servizio alla specie umana col portare a termine il suo lavoro, e che tutti i medici debbano portare il loro contributo sulle tracce che egli ed i suoi collaboratori hanno lasciato.

SUMARIO E CONCLUSOES

1. Hemorragia craniana em recen-nascidos, foi observada em 9% de uma serie de 500 crainças submetidas a punção lombar nas primeiras 24 horas de vida.

2. Os sinais mais comumente observados são o estupôr, agitação, eomtrações musculares, convulsões, rigidez e cianóse.

3. Primeiro filho, meinos nascidos após parto demorado e dificil, os nascidos com auxilio de forceps, os oriundos de apresentação pelvica, são os mais sujeitos a hemorragia intra-craniana ao nascerem.

4. A doença hemorragica do recen-nato e a sifile dos pais da criança não são fatôres predominantes na hemorragia intracraniana dos recen-nascidos.

5. A punção lombar é o metodo melhor empregado para o diagnostico precoce, quando a hemorragia ainda está em inicio, sendo um processo simples e salvador.

6. O diagnostico precoce e o tratamento adequado para a hemorragia intra-craniana aguda do recen-nascido podem evitar uma grande percentagem de perturbações fisicas e mentais de crainças, as quais se tornam, regra geral, crônicas.

7. Toéde 1º de janeiro de 1923, foram examinadas 5.192 crianças com perturbações cerebrais; destas, 671 demonstraram sinais evidentes de pressão intra-craniana elevada, cerca de 12%, portanto.

8. 654 dessas crianças foram operadas depois, evidenciando hematômas intracranianos, provavelmente originarios do parto. Foram feitos filmes antes e após a intervenção; segundo se poude observar, as melhoras foram registradas nas crianças até 3 anos, e, raramente, naquelas até 10 anos de idade.

9. De 5.192 pacientes, 1.787 tiveram processo infecioso agudo, associado a hipertemia; em tais casos o diagnostico feito foi de meningite ou meningo-encefalite. Dêsses doentes, 1.685 apresentavam convulsões no ensejo da afecção aguda. Esses poderiam ter sido submetidos a tratamento cirúrgico (remoção do tecido cicatricial e descompressão da area edematosa do cerebro).

10. Foram registradas 69 mortes na estatistica apresentada, e as hemorragias intra-cranianas de recen-nascidos foi evidenciada em 67 das necropsias praticadas. Em dois casos, foi observado um pronunciado edema cerebral.

11. Em 1862, Mr. Little, expressou sua opinião de que 70% dos casos, a hemorragia intra-craniana é a causa evidente da paralizia cerebral espasmódica. Sharpe, chegou a mesma conclusão.

Após analizar tudo que foi escrito e observado até então sôbre o assunto, assim conclue o autôr:

1. A hemorragia intra-craniana do

recen-nascido é um causa potencial da paralizia cerebral espasmódica;

2. A punção lombar com a fimalidade de drenagem nos casos de hemorragia intra-craniana, é um processo correto para tratamento, na maioria dos pacientes. Nos casos de perturbações crônicas, é a craniotômia, se praticada antes dos seis anos de idade do doente, o tratamento mais correto para diminuir a pressão intra-craniana, extirpar cistos, aderencias etc.

Não existe duvida de que o Dr. Sharpe prestou um enorme serviço à humanidade, devendo servir de base para todos os medicos interessados nesse assunto, os principios de diagnostico e tratamento que êle e os seus assistentes estabeleceram.

RÉSUMÈ

L'auteur rapporte neuf cas d'hémorragie cérébrale sur 500 cas de nouveau-nés ayant subi la ponction lombaire. Les faits évidents sont la stupeur, la difficulté de nourrir l'enfant, certains spasmes musculaires et de la cyanose. Certaines présentations fournissent plus que d'autres des possibilités d'hemorragie intra-cranienne.

Une malaide hémorragique ou la syphilis ne sont pas des causes déterminantes d'hémorragie. La ponction lombaire est le procédé de diagnostic de choix. Un diagnostic précoce amène un traitemente précoce. Sharper, sur 5,192 cas, en date du 1-1-1923, avait rapporté 671 cas d'hypertension intra-crânienne. De ces cas, 654 furent opérés avec des résultats de 3 à 10 ans. Parme les 5,192 patients, 1,787 présentèrent une pathologie associée. Le traitement chirurgical les a améliorés. On rapporte 69 mortalités, dont 2 cas d'oedème cérébrale.

Little en 1862, a émis l'opinion que 70% des cas présentàient de l'hémorragie intra-crânienne, Sharpe est du même avis et donne les conclusions suivantes: 1° L'hémorragie intra-crânienne des nouveau-nés cause de la paralysie cérébrale. 2° La ponction lombaire est le procédé de drainage de choix associée à la craniotomie pour enlever la cause de la compression. L'enfant ne pourra dépasser l'âge de 6 ans.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. In der Sharpeschen Serie von 500 unausgewählten Kindern, die während der ersten 24 Stunden des Lebens lumbalpunktiert wurden, wurden Blutungen innerhalb des Schädels zur zeit der Geburt in 9% der Fälle beobachtet.

2. Sharpe bemerkt, dass die häufigsten Anzeichen der intrakraniellen Blutung beim Neugeborenen Schläfrigkeit (bis zum Grade der Betäubung), Stillschwierigkeiten oder Nahrungsablehnung, Muskelzuckungen, Krampfanfälle, Körperstarre und Zyanose sind.

3. Erstgeborene Kinder, vollausgetragene durch schwierige, prolongierte Entbindung geborene Knaben, "mittelhohe Zangenfälle" und Steissgeburten zeigen eine erhöhte Neigung zur intrakraniellen Blutung des Neugeborenen.

4. Hämorrhagische Erkrankungen des Neugeborenen und Syphilis der Elten oder des Kindes spielen bei der intrakraniellen Blutung des Neugeborenen keine vorherrschende Rolle.

5. Die Lumbalpunktion, als frühzeitiges diagnostisches Verfahren, solange die Blutung noch flüssig ist, angewandt, ist eine einfache und ungefährliche Methode, solange kein schwerer Schock vorliegt.

6. Die frühzeitige Erkennung und ausreichende Behandlung der akuten intrakraniellen Blutung des Neugeborenen kann zur Herabsetzung der grossen Anzahl körperlich und geistig chronisch behinderter Kinder beitragen.

7. Sharpe untersuchte bis zum 1. Januar 1923 5192 hirnspastische Kinder. 671 von diesen (ungefähr 12%) zeigten deutliche Zeichen erhöhten intrakraniellen Druckes.

8. 654 dieser Kinder wurden operiert und gestatteten eine Bestätigung des Vorliegens intrakranieller wahrscheinlich neonataler Blutung. Vor und nach der Operation ausgeführte Filmaufnahmen zeigten eine eindrucksvolle Besserung nach der Operation bei den Kindern bis zum Alter

von drei und gelegentlich auch zehn Jahren.

9. Von den 5192 Kranken hatten 1787 eine akute fieberhafte Erkrankung aufzuweisen. Bei ihnen wurden die Krankheitserscheinungen auf Meningitis oder Meningoenzephalitis zurückgeführt. 1685 von ihnen zeigten Krampfanfälle zur Zeit der akuten Erkrankung. Solche Fälle sind chirurgischer Behandlung zugänglich (Entfernung des Narbengewebes und Dekompression des ödematösen Hirns).

10. Die Serie weist 69 Todesfälle auf; 67 davon zeigten bei der Obduktion neonatale intrakranielle Blutung. In den bieden anderen handelte es sich um ein schweres Hirnödem.

11. Little sprach in seiner zweiten Monographie über zerebrale Kinderlähmung im Jahre 1862 die Meinung aus, dass in fast 70% der Fälle eine intrakraniale Blutung als Ursache in Frage käme. Sharpe war überzeugt, dass zerebrale Kinderlähmung in etwa 70% der Fälle auf intrakranieller Blutung beruhe.

Wenn man die Fülle der Informationen, die uns Sharpe gibt, analysiert, kommt man zu gewissen endgültigen Schlussfolgerungen:

a. Die intrakranielle Blutung des Neugeborenen ist ein bedeutender ursächlicher Faktor in der zerebralen Kinderlähmung.

b. Beim Vorliegen frischer flüssiger intrakranieller Blutungen sind die zum Zwecke der Rückenmarksdrainage ausgeführten Lumbalpunktionen in den meisten Fällen wirksame therapeutische Massnahmen. Die ein- oder beiderseitige Entfernung von Gerinnseln, Zysten oder Verwachsungen mittels der Kraniotomie und die dauernde Senkung des erhöhten intrakranialen Druckes bilden wirksame Behandlungsmethoden der chronischen Zustände, ween sie vor dem siebenten Lebensjahr angewandt werden.

Es kann keinem Zweifel unterliegen, dass Sharpe mit der Durchführung der gewaltigen Aufgabe, die er sich gesetzt hat, der Menschheit einen grossen Dienst erwiesen hat, zu dem jeder Arzt sein Teil beitragen kann, wenn er die von Sharpe und seinen Mitarbeitern aufgestellten Richtlinien für die Diagnose und Behandlung befolgt.

REFERENCES

1. Denis: Commercy, 1826.
2. Billard: Paris, 1828.
3. Cruveilhier: Paris, 1829-35.
4. (a) Little, J. W.: Deformities of the Human Frame. Lancet 2:350, 1843. (b) Little, J. W.: On the Influence of Abnormal Parturition, Difficult Labors, etc., upon the Mental and Physical Condition of the Child, Obst. Tr. 3:243, 1862.
5. MacNutt, S. J.: Am. J. Obst. 18, 1885.
6. Beneke: München med. Wchnschr.: 1910, p. 2125.
7. Pott: Zeitscher, F. Geburtsch u. Gynakol. No. 69, 1911.
8. Mayer, A.: Zentralbl. f. Gynakol. No. 46, 1915.
9. Halland: Trans. Edinburgh Obst. Soc. 1918, p. 40.
10. Schafer: Zeitschr: f. Geburtsch u. Gynak. 1921, vol. 64.
11. Schwartz, R. München med. Wchnschr. 1922, No. 30. Schwartz, R.: Deutsche, med. Wchnschr., Oct. 3, 1924.
12. Saenger, H.: Monatschr, f. Geburtsch u Gynak. 65:257-274, 1924.
13. Capon, N. B.: J. Obst. and Gynaec. British Empire 39:572, 1922. Capon, N. B.: Lancet: 1203-1206, 1924.
14. Barnett, E. J.: Northwest Med. 21:243, 1922.
15. Fischer, B.: Schwarz med. Wechnschr. 1924, Oct. 2.
16. Huenekens, E. J.: Care of the Newborn, J.A.M.A. 81:624, 1923.
17. Sharpe, W., and Large, N.: Neurosurgery: Principles, Diagnosis and Treatment. Philadelphia: J. B. Lippincott Co., 1928, pp. 100-146.

The Clinical Management of Pruritus Ani

LAWRENCE S. MANN, M.S., M.D., F.A.C.S., F.I.C.S.
CHICAGO, ILLINOIS

PRURITUS ani is a symptom complex which is the manifestation of one or more diseases rather than an entity in itself. Therefore, in its management a careful search must be made for the underlying pathologic condition. Usually more than one factor is involved. In order to treat the patient successfully, a thorough history must be taken; a complete physical examination, including anal, perianal, proctoscopic and vaginal investigations, must be made, and certain laboratory tests must be performed.

The history may reveal the presence of diabetes, cholecystitis or disease of the liver, which may be predisposing factors in a small percentage of cases. The pruritus associated with these conditions, however, is generalized. Most patients have only localized pruritus, which may be more severe at night. In almost all there is a neuropsychiatric component present in the form of worry, tension or fear. A very high percentage have allergies, particularly to food, drugs and clothing. Many patients treat themselves with home remedies containing local anesthetics (the "caine" derivatives), which, because of their sensitivity to these drugs, only makes their condition worse.

Pruritis ani may follow the use of certain antibiotics. Excessive perspiration may predispose to pruritus, because the sweat in the anal area is high in protein and carbohydrate and the *p*H is on the alkaline side. This acts as a good medium for fungus with secondary infection in the area. The patients vary in age from 10 to 45, male patients predominating. The highest incidence is in the second and third decades of life. In most cases the indirect cause is neurogenic and allergic.

After a thorough history has been taken, a complete physical examination is performed and any systemic disease is treated accordingly. An anoscopic and proctoscopic examination is then performed. The appearance of the anal skin may vary in different stages but is generally typical, with the radiating folds thickened and elongated. A blood count, a urinanalysis, anal scrapings for fungi, meticulous stool examination (for parasites and worms) and culture studies are important. A complete allergy workup follows.

The three most important factors bearing on the treatment of this condition are the neurogenic, allergic and anal hygiene components. After the cause of tension and worry has been explained, the patient usually understands his condition. Sedation in the form of a barbiturate may be given for a few weeks and then prescribed as the need arises. All foods to which the patient is allergic are eliminated from his diet, as is contact with other sensitizing agents. For example, one child was found to be sensitive to horsehair, which covered his bicycle saddle; another to the nylon drawers he was wearing. Antihistamines are used orally for two to six weeks.

A bland diet low in rough, irritating fiber is prescribed for two to three weeks. Coarse, highly seasoned, gas-forming or fried foods, as well as large amounts of acid foods, are forbidden. Extreme temperatures in food are undesirable. The following list of foods may be allowed, with elimination of any to which the patient is sensitive:

Beverages: Cream, milk, eggnog, cocoa, malted milk, tomato juice, orange juice, Sanka, Postum.

Bread: Toasted white bread, day-old white bread, zwieback, or soda crackers.

From the Department of Surgery, Chicago Medical School, Chicago, Illinois
Submitted for publication Dec. 4, 1952.

Cheese: Cream or cottage.

Cereals: Strained oatmeal, cream of wheat, farina, ralston, cornmeal, rice, cornflakes, puffed rice, rice krispies, rice flakes.

Desserts: Plain ice cream, ices, custard, simple puddings, gelatin desserts, sponge cake and other plain cakes.

Eggs: All forms except fried or scrambled in fat.

Fat: Butter.

Fruits: Applesauce; baked apple without skin; ripe or baked bananas; fruit juices; stewed or canned pears, peaches, or peeled apricots; puree of all dried fruits except figs.

Meat, fish and poultry: Lamb, beef, well cooked or scraped; liver, sweetbreads, oysters, crisp bacon, chicken and whitefish (all will be boiled, broiled or baked.)

Potato: All forms except fried.

Potato substitutes: Macaroni, spaghetti, vermicelli, rice and noodles.

Soup: Cream soup.

Vegetables: Puree of asparagus, beets, squash, peas, string beans, spinach and carrots.

A routine for anal hygiene is prescribed. A twenty-minute hot sitz bath several times a day is recommended. Cotton wipes are used after a bowel movement, instead of toilet tissue. A hot sitz bath is prescribed immediately after a bowel movement. Mineral oil or one of the methyl cellulose products may be used every other day when needed to permit ease in evacuation.

Locally, (1-B dimethylaminoethoxy)-3-n-butylisquinoline hydrochloride (Quotane®) may be used for anesthetic effect. Chemically this is unrelated to the "caine" group, to which a very high percentage of patients are allergic. The ointment may be prescribed for dry, fissured lesions and the lotion for moist, oozing lesions if necessary. Its use is recommended four to five times daily. The local rectal pathologic area is treated medically until the irritation is completely cleared, after which the indicated surgical therapy may be instituted.

If the patient is obese his weight is reduced, because obesity generally produces an increase in perspiration and discomfort. Bacterial or parasitic infections are properly treated. Fungus infections are treated with one of the new fungicides, in ointment form for dry fissured lesions and in liquid form for the moist, oozing type. The local use of bacitracin is of value in treating infections. Some local lesions, such as anal psoriasis or seborrheic dermatitis, may require the aid of a dermatologist. If ovarian deficiency is present it must be properly treated. Persistent efforts will generally bring about complete remission in three to six months.

CONCLUSIONS

1. A complete history, thorough physical examinations and certain laboratory tests are essential to proper clinical management of pruritus ani.
2. The most important components in these cases are (1) neurogenic, (2) allergic and (3) related to anal hygiene.
3. Persistent efforts will generally bring about complete remission in three to six months.

CONCLUSIONI

1. Per una cura efficace del "pruritus ani" è indispensbile una anamnesi completa, un esame fisico accurato e un certo numero di indagini di laboratorio.
2. I fattori più importanti dell'affezione sono (1) neurologici, (2) allergici, (3) igienici.
3. La terapia continuata per un periodo da 3 a 6 mesi condurrà, di regola, alla guarigione completa.

RÉSUMÈ

Pour bien traiter le prurit anal, il faut connaître l'histoire du cas, pratiquer un examen physique et des tests de laboratoire. Les prurits saillants sont d'origine neurogène, allergique, hygiénique. Un effort constant amène des résultats.

CONCLUSIONES

1. Para la atención clínica adecuada del prurito anal se requiere una historia completa a través de exámenes físicos y ciertas pruebas de laboratorio.

2. Los componentes más importantes en estos casos son: (1) neurogénicos, (2) alérgicos, y (3) relacionados a la higiene del ano.

3. Esfuerzos persistentes, generalmente producen desaparición completa de tres a seis meses.

SCHLUSSFOLGERUNGEN

1. Vollständige Anamnese, sorgfältige arztliche Untersuchung und die Anwendung gewisser Laboratoriumsmethoden sind wesentlich für eine richtige klinische Behandlung des Pruritus ani.

2. Die wichtigsten Ursachen der Erkrankung sind (1) neurogenischer, (2) allergischer und (3) analhygienischer Art.

3. Beharrlich fortgesetzte Behandlungsversuche führen im allgemeinen zu völligem Verschwinden der Erscheinungen innerhalb von drei bis sechs Monaten.

CONCLUSOES

1. Uma anamnése perfeita, além do exame completo do doente e de certas provas de laboratório, são essenciais para facilitar um correto tratamento clínico do prurido anal.

2. Os fatôres etio-patogênicos mais importantes nêstes casos são aquêles de ordem neurogênica, de origen alérgica e outros relacionados com a higiêne anal.

3. Esforços persistentes poderão levar o doente a sua completa cura, entre três e seis mêses de tratamento.

Qualifying Examinations for Fellowship in the United States Section of the International College of Surgeons will be held on May 4 and 5, August 10 and 11, and November 2 and 3, 1953. The examinations will be given at the Cook County Graduate School of Medicine and the Cook County Hospital. Applicants are requested to address communications to Dr. Harry A. Oberhelman, Secretary, Examination and Qualification Council, 1516 Lake Shore Drive, Chicago 10, Ill.

Fat Embolism: Its Relation to Intramedullary Nailing

CARLO S. SCUDERI, M.D., Ph.D., F.A.C.S., F.I.C.S.
CHICAGO, ILLINOIS

Intramedullary nailing has become an accepted method of treating fractures of the long bones. Kuntscher developed the instruments and technic for intramedullary nailing as it is known today. The excellent results obtained by the German surgeons during World War II were so outstanding, especially with fractures of the shaft of the femur, that the method gained world renown shortly thereafter.

In the interval between the end of the war and the time of writing, many of the pitfalls and errors of intramedullary nailing have been worked out, and its limitations and advantages have become better defined. At present the method has become standardized, is used by trained surgeons with outstanding success, and is here to stay for an indefinite period.

Inevitably the surgeon asks himself at one time or another, "What are the dangers of fatal fat embolism?". In my opinion fat embolism is probably the least common of all the complications that may arise from intramedullary nailing. Should it arise it would be most difficult to diagnose, for reasons to be explained later, and even if it were diagnosed correctly no specific treatment is available as yet. The exact mechanism of its production is not clear, and much of the evidence presented in the literature is contradictory and confusing. This is no way the fault of the investigators but is inherent in the nature of this uncommon and obscure condition. It has been calculated by Lehman and Moore[1] that the total fat content of the medullary canal of an adult femur is 65 cc. From calculations of the minimal lethal dose in dogs, based on cubic centimeters per kilogram of body weight, it would appear that 120 cc. of intravascular fat is the minimal amount required to cause death in an adult human being. This, of course, is based on the assumption that the reaction of dogs and humans to intravascular fat would be the same. Whether or not this supposition is correct, it brings out the point that one or more other factors must come into play in order to produce a case of fatal fat embolism.

Historical Data.—Those interested in the history of fat emoblism would find it worth while to read several modern reviews on the subject. Warthin[2] (1913), Scuderi[3] (1934) and Groskloss[4] (1936) are suggested. There are over 650 known articles in the literature referable to this condition. A few keystone references related to the present discussion will be mentioned. Lower[5] in 1669 was probably the first to do any work related to fat embolism when he injected milk intravenously in dogs. Magendie[6] investigated the effects of lipemia on the circulatory system of animals, from 1821 to 1836. His description of the experimental introduction of liquid oil into the venous circulation is classic.

In 1880 Scriba[7] conducted animal experiments, reviewed the literature and reported some cases of his own in such a classic manner that most of present-day knowledge dates back to his writings. Some of his deductions have been found, in the intervening years, to be incorrect, but his work was a milestone in the study of this disease.

Lehman and Moore[1] in 1927 demonstrated by *in vitro* experiments that histamine extracted from necrotic muscles produced rapid disintegration of the normal

Submitted for publication Sept. 17, 1952.

fat emulsion of normal blood serum. Such a process could very well liberate a great deal of intravascular fat *in vivo* and account for the large amount of fat necessary to produce fat embolism. This theory served to explain why pathologic intravascular fat could be observed in various organs of the body in patients who died from complications other than those produced by fractures.

Etiologic Data.—The etiologic factors of fat embolism are quite obscure. There is reason to believe that the fat from bone marrow is not the sole cause of this condition, as there does not appear to be enough fat in a femur to cause death. However, the presence of fat in bone marrow plus an emulsion-splitting substance, such as histamine from damaged muscle tissue, may cause death. The histamine may destroy the normal fat emulsion in the blood stream, causing the coalescence of fat droplets and producing a true embolism (Lehman and Moore[1]).

On the other hand, the breaking up of the normal trioleate of bone marrow fat, a neutral fat, to oleic acid, a very toxic oil, may be the causative agent. The amount of oleic acid required to produce death in experimental animals is only one-seventh of the amount of neutral fat required (Jirka and Scuderi[8]). What enzyme or protein split product can produce this transition *in vivo* is not known.

Paul and Windholz,[9] and later Domanig,[10] have shown that repeated introduction of small doses of fat intravenously enables the animal to build up a resistance to several times the minimal lethal dose. It is believed that the tissues become adjusted to the more rapid absorption of the fat. No apparent lipase or fat enzyme is developed, because massive transfusions of an immunized dog will not increase the dog's tolerance to intravascular fat droplets (Scuderi[11]).

Pathologic Data.—Vance,[12] in 1931, published a comprehensive paper on the pathologic aspects of fat embolism. It is a classic of the current literature on the subject and should be read by all those interested in this phase of the problem.

Intravascular fat droplets have been observed at autopsy after death resulting from conditions not related to trauma. The literature is full of reported cases in which fat embolism was present after pneumonia, childbirth, acidosis, phlegmonous gastritis, hepatitis, tuberculosis and a host of other conditions. For this reason, the postmortem table is not the final court of appeal. Only a few of the authors who have demonstrated this fact will be mentioned at this point.

Lehman and McNattin[13] observed fat embolism in the lungs in 50 per cent of unselected cadavers examined at autopsy.

Wright[14] noted that fat embolism was present in 52 per cent of 100 consecutive autopsies. In none of these cases had there been a history of trauma, nor did any traumatic effects appear at autopsy.

Carrara[15] observed fat embolism at autopsy in 22 per cent of patients who died of cardiovascular renal disease and in 44 per cent of patients who died of burns.

Catsaras[16] observed intravascular fat droplets in 18 of 67 cases of postinfluenzal pneumonia.

The reason fat embolism occurs most frequently after a fracture, as explained by Gauss[17] is that the veins encased in a bony wall cannot collapse. They remain open, and the increased pressure produced by the arterial blood spurting into the injured area forces the fat into the veins and then into general circulation.

It must be kept in mind that fat embolism is not a true embolism in the sense that it produces complete obstruction of a vessel. The fat droplets elongate into an amoeboid form, and with each pulsation of the heart the small mass of fat is pushed along the long axis of the capillary until it passes the capillary bed and once more gets into the venous system. I have repeatedly observed this under the microscope, in the web of a frog's foot while studying other phases of the problem.

Gauss[18] has demonstrated that one part olive oil in nine parts of blood serum increases the viscosity of the serum three times.

Symptoms.—Probably the first symptom of fat embolism is mental disturbance or delirium, due to impaired circulation to the brain.

The incubation period varies from a few hours to three or four days. Although there are many exceptions, it is a good thing to remember Dennis' rule—shock, three hours; fat embolism, three days; pulmonary embolism, three weeks (Speed[19]).

Increased respiration is probably the second most common symptom. It is accompanied with an increased pulse rate and slowly rising blood pressure.

The rise in temperature depends on the extent of disturbance in the heat-regulating center, or on the degree of pulmonary edema. In the later stages, it is due either to toxicity of histamine split products or to the splitting of the neutral triolein to oleic acid. Temperatures as high as 106 and 107 have been recorded.

Petechial hemorrhages may occur in some cases. Le Count and Gauss[20] published the results in 14 cases of fatal fat embolism. The symptoms that occurred prior to death were as follows: Dyspnea was present in all 14 cases. In 12 cases delirium of a high grade existed. The average respiratory rate was 53 per minute. The pulse became weak and shallow prior to death, averaging 153 pulsations per minute. Involuntary loss of urine and feces occurred in 12 cases. For all 14 cases the average temperature was 105.2 F. The interval from onset of symptoms to death was from two to seventeen days, or an average of six days.

Cyanosis depends on the amount of pulmonary impairment and need not be an outstanding manifestation until the patient is near death.

Diagnosis.—Undoubtedly fat embolism in fractures is more common than one would be led to believe, because only when the condition is severe is it either suspected or diagnosed; mild involvement escapes notice.

Nervousness, irritability or delirium are probably the most important clinical manifestations. Dyspnea and cyanosis occur, together with increased pulse rate and slowly rising blood pressure.

The fever is slight in the early phase and in cases of mild involvement, the temperature varies from 105 to 107 F. in the severe or preterminal stages.

Petechiae are present in a small percentage of cases.

Examination of the eye fields frequently reveals droplets of fat in the retinas.

The presence of large circular cells of Elting and Martin[21] or the fat globules of Warthin[22] are suggestive but not pathognomonic, as was formerly thought, because other conditions of the chest reveal a similar picture.

Careful studies of the urine are helpful, but here one must be well versed in the procedure. Jirka and Scuderi[23] in 1935 demonstrated, by both clinical and experimental evidence, that only the last 1 or 2 cc. of urine in the bladder will contain fat droplets if present. Therefore, catheterized centrifuged specimens are necessary. Staining with Sudan III will then permit isolation of the droplets under the microscope.

If a superficial layer of the urine specimen is taken on a platimum loop and held over a flame, dilutions of fat in suspension in a ratio of 1:1,400 can be detected by the explosive sound made by the fat droplets when heated. This very simple and efficient "sizzle test" was first described by Jirka and Scuderi[23] in 1935.

In experimental animals intravascular fat always produces a clouding of the upper lung fields, which led me to conclude that flat chest plates are of some diagnostic value in these cases (Jirka and Scuderi[8]).

In the differential diagnosis, delirium tremors, skull fractures, bronchopneumonia and shock must be seriously considered.

Prognosis.—As only severe or fatal condition is diagnosed, many have the idea that fat embolism is a serious complication. Although it can and does produce death occasionally, the general outlook is good.

Treatment. — The literature offers a great many suggested or empirical treatments, but up to the time of writing there is no specific or scientifically proved effec-

tive therapy. For the present, at least, the treatment must be symptomatic.

Numerous intravascular emulsifiers have been tried on experimental animals both by the author and by others, without any success.

CONCLUSIONS

Fat embolism is probably the least likely complication to result from intramedullary nailing. Its diagnosis is usually difficult to make. Some helpful diagnostic procedures are mentioned. No specific treatment is known, and therefore treatment is symptomatic. Since all bone marrow from an adult femur is insufficient to cause death, the author is convinced that the split products of the neutral olein of bone marrow may be an etiologic factor in fat embolism. This substance is seven times as lethal as neutral bone marrow fat, and a quantity sufficient to cause death could easily be available in the body.

CONCLUSIONES

A embolia gordurosa é, provavelmente, a mais seria das complicações resultantes da sindrôme estudada pelo autôr.

O seu diagnostico é comumente dificil de se fazer, sende mencionados alguns processos mais facizes de diagnostico. O tratamente é meramente sintômático, de vez que, até antão, não se conhece qualquer tratamento especifice.

Si bem que toda a medula óssea de um femur adulta seja insuficiente para ocasionar a morte por embolia gordurosa, o autôr acredita que a propagação da oleina neutra da medula óssea póde sêr um agente etiologico da embolia gordurosa. Essa substancia é sete vezes mais mortal que a gordura neutra da medula óssea, e em quantidade suficiente para causar a morte, podendo sêr calculada em sua percentagem, facilmente, no corpo humano.

SCHLUSSFOLGERUNGEN

Die Fettembolie bildet wahrscheinlich die am wenigsten zu erwartende Komplikation, die in Verbindung mit der intramedulären Nagelung auftreten kann. Die Diagnose ist gewöhnlich schwierig. Einige hilfreiche diagnostische Prozeduren werden erwähnt. Eine spezifische Behandlung gibt es nicht; die Therapie ist daher symptomatisch.

Da das gesamte Knochenmark des Oberschenkelknochens des Erwachsenen nicht als Todesursache ausreichen würde, ist der Verfasser überzeugt, dass die Spaltprodukte des neutralen Oleins des Knochenmarks eine ursächliche Rolle bei der Fettembolie spielen. Dieser Stoff ist siebenmal so tödlich wie das neutrale Knochenmarkfett, und es mag sehr leicht eine als Todesursache ausreichende Menge davon im Körper vorhanden sein.

CONCLUSIONES

Probablemente la embolia grasosa es la complicación mínima que se produce por el enclaviffiamiento intramedular. Su diagnóstico es geeneralmente difícil de hacer. Se mencionan algunos procedimientos útiles para el diagnóstico. No se conoce ningun tratamiento específico, siendo por lo tanto el tratamiento sintomático.

Ya que toda la médula ósea de un fémur adulto es insuficiente para producir la muerte, el autor esta convencido que los productos de la división de la grasa neutra de la médula ósea pueden ser un factor etiológico en la emoblia grasosa. Esta substancia es siete veces más letal que la grasa neutra de la médula ósea y en el cuerpo hay facilmente disponible una cantidad suficiente para causar la muerte.

RÉSUMÈ

L'embolie graisseuse est la moindre des complications consécutives à la mise en place d'un clou intra-médullaire. Le diagnostic est souvent difficile à poser et l'auteur en suggère certains moyens. Il donne aussi son opinion quant à la cause de l'embolie: la section de la moëlle osseuse, n'est pas tellement toxique en comparaison des embolies causées par les huiles neutres.

CONCLUSIONI

L'embolia adiposa è probabilmente la più rara complicazione del-l'inchiodamento midollare. La diagnosi di essa è di solito difficile. Vengono ricordati alcuni elementi diagnostici utili. Non si conosce elcuna cura specifica, e quindi la terapia è sintomatica.

Dacchè tutto il midollo osseo di un femore di adulto è insufficiente a causare la morte, l'autore è convinto che i prodotti di scissione dell 'oleina neutra del midollo osseo possano essere i fattori etiologici dell 'embolia adiposa. Questa sostanza è sette volte più letale del grasso neutro del midollo osseo e può raccogliersi nel corpo umano in quantità sufficiente e produrne la morte.

REFERENCES

1. Lehman, E. P., and Moore, R. M.: Arch. Surg. 14:621-662, 1927.
2. Warthin, A. S.: Internat. Clin. 4:171-227, 1913.
3. Scuderi, C. S.: Internat. Surg. Digest 18: 195-215, 1934.
4. Groskloss, H.: Yale J. Biol. & Med. 8:59-91, 1935-1936.
5. Lower, Cited by Flournoy. Paris and Strasbourg, 1878.
6. Magendie, F.: Leçons sur les phénomènes phys. de la vie 2, 1836.
7. Scriba, J.: Deutsche Ztschr. f. Chir. 12:118, 1880.
8. Jirka, F., and Scuderi, C. S.: Arch. Surg. 33:708-713, 1936.
9. Paul, M., and Windholz, F.: Mitt. a. d. Grenzgeb. d. Med. u. Chir. 38:614-651, 1925.
10. Domanig, E.: Deutsche Ztschr. f. Chir. 236:693-703, 1932.
11. Scuderi, C. S.: Surg. Gynec. & Obst. 72: 732-746, 1941.
12. Vance, B. M.: Arch. Surg. 23:426-465, 1931.
13. Lehman, E. P., and McNattin, R. F.; Arch. Surg. 17:179-189, 1928.
14. Wright, R. B.: Ann. Surg. 96:75-84, 1932.
15. Carrara, M.: Freidreich's Bl. f. gerichtl. Med. 49:241-279, 1898.
16. Catsaras, J.: Presse méd. 28:618, 1920.
17. Gauss, H.: Arch Surg. 9:593-605, 1924.
18. Gauss, H.: Arch. Int. Med. 18:76, 1916.
19. Speed, K.: Fractures and Dislocations. Philadelphia: J. B. Lippincott Co., 1916.
20. Le Count, E. R., and Gauss, H.: Tr. Chicago Path. Coc. 9:251, 1915.
21. Elting, A. W., and Martin, C. E.: Ann. Surg. 82:336-353, 1925.
22. Warthin, A. S.: Internat. Clin. 4:171-227, 1913.
23. Jirka, F., and Scuderi, C. S.: J. of Lab. & Clin. Med. 20:631, 1935.

BECAS OTORGADAS POR EL CAPITULO ARGENTINO

En el transcurso del año 1952 el Capítulo Argentino ha otorgado 4 becas internas y 2 externas, las cuales fueron cumplidas en los siguientes servicios:

Instituto de Cirugía Torácica y de la Tuberculosis, Director Prof. Dr. Jorge A. Taiana:
2 becas internas
1 beca externa

Instituto de Medicina Experimental, Director Prof. Dr. Abel N. Canónico:
1 beca externa

Policlínico Ramos Mejía—Servicio del Prof. Dr. Normando Arenas:
1 beca externa

Policlínico Rawson-Servicio del Prof. Dr. Ricardo Finochietto:
1 beca externa

Policlínico Ramos Mejía—Servicio del Prof. Dr. Carlos M. Masco:
1 beca externa

Traumatic Laceration of Stensen's Duct Producing Intermittent Obstruction

JOSEPH HERSH, M.D., F.A.C.S., F.I.C.S.
PITTSBURGH, PENNSYLVANIA

IN evaluating deep lacerations of the cheek the anatomic course taken by the parotid, known also as Stensen's duct, must be considered in undertaking their surgical repair. Stensen's duct leaves the upper anterior portion of the parotid gland about 1 cm. below the zygoma and runs on a line joining the lower edge of the cartilaginous portion of the ear with the middle of the upper lip. It opens on a papilla on the inside of the cheek opposite the second upper molar tooth. Deep lacerations in this area may injure the duct and result in a salivary fistula.

Below this projected line and parallel to it are situated the buccal branches of the facial nerve, severance of which may produce paralysis of the upper lip.

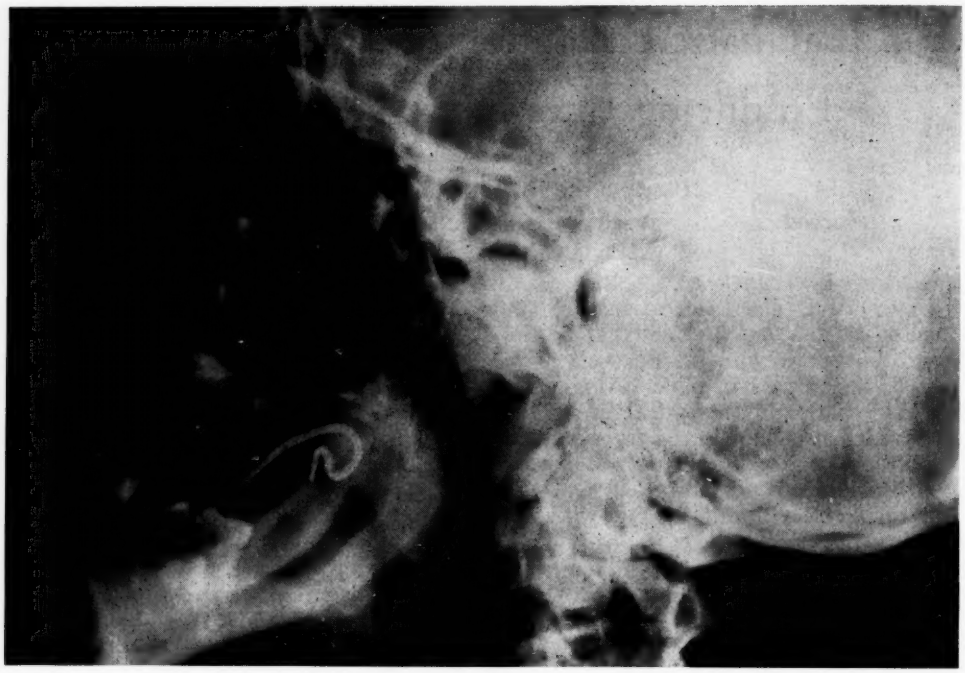
Stensen's duct commences by numerous branches, converging toward the anterior border of the parotid and receiving in its passage across the masseter muscle the duct of the accessory parotid gland. The canal is about 35 to 40 mm. in length, with a diameter of 3 mm. The wall of the duct is thick and tough, and consists of fibrous tissue intermixed with smooth muscle fibers.

In hollow viscera — for example the stomach, intestines and gallbladder, and the urinary bladder in the case of partial obstruction—hypertrophy is marked owing to active efforts to force past the obstruction. In the presence of complete obstruction the muscular contractions cease and dilation takes place above the obstruction. In the first case the result is a small cavity with thick walls; in the second, a large cavity with thin walls. This principle of hypertrophy and dilatation associated with intermittent obstruction must be attributed to Stensen's duct as well, because in the case here to be reported it was possible to pass a No. 6 ureteral catheter with ease into the duct to act as a splint during the healing process.

REPORT OF CASE

W. W., a Negro aged 51 years, was admitted from the surgical dispensary of Passavant Hospital on Feb. 15, 1945, with a history of being cut on the left cheek during a scuffle two weeks earlier. The wound was sutured in the emergency room by the intern in charge, and forty-eight hours later the left side of the patients face became swollen. This was treated as possibly due to suppuration until the patient was seen in this surgical clinic on February 15, when careful examination revealed a severed Stensen's duct partially obliterated by by the vertical scar on the inside of the cheek. On pressure applied on the outside of the left parotid gland saliva appeared at the site of trauma. A vertical scar measuring 3½ inches (8.9 cm.) was present on the left cheek, bisecting a line drawn from the lower edge of the cartilaginous portion of the ear to the middle of the upper lip. Paralysis of the muscles contracting the left corner of the mouth was present.

On February 17, with local infiltration anesthesia (1 per cent solution of procaine hydrochloride) the fistula on the inside of the mouth was dilated and split longitudinally. The opposite ends of the split duct were sutured to the area of denuded scar tissue with three stay sutures; this enlarged the internal opening, after which a No. 6 ureteral catheter was inserted into the duct with ease and sutured in place to prevent stenosis during



Film showing No. 6 ureteral catheter inserted into Stensen's duct.

healing. The catheter was extruded on the eighth postoperative day, and in three weeks healing was complete.

SUMMARY

A case of injury of Stensen's duct is presented, in which the condition was overlooked at the time of the primary wound suture. The severed duct produced an internal fistula, which was troublesome only because it caused intermittent obstruction with swelling and pain in the region of the parotid gland.

Intermittent obstruction of Stensen's duct produces hypertrophy and dilatation of the duct, as does obstruction elsewhere in the hollow viscera of the body.

RESUMEN

Se presenta un caso de lesión del conducto de Stenon, en el cual la lesión fué desapercibida en el momento de la sutura primaria de la herida. El conducto lesionado produjo una fístula interna, que fué molesta unicamente por que produjo obstrucción intermitente con crecimiento y dolor en la región de la glándula parótida.

La obstrucción intermitente del conducto de Stenon produce hipertrofia y dilatación del conducto, igualmente a lo que hace una obstrucción en cualqier viscera hueca del cuerpo.

SUMARIO

Um caso de lesão do canal de Stensen é registrado, no qual foi ela observada no ensejo da sutura primaria da ferida. A lesão produzio uma fistula interna, a qual causou obstrução intermitente, acompanhada de intumescencia e dôr da região parotidea.

A obstrução intermitente do canal de Stense, provoca hipetrofia e dilatação do

canal, da mesma forma que provocam as obstruções em qualquer viscera do organismo humano.

ZUSAMMENFASSUNG

Es wird der Fall einer Verletzung des Stensenschen Ganges berichtet, die zur Zeit der primären Wundnaht übersehen worden war. Der durchtrennte Gang rief eine innere Fistelbildung hervor, die nur deshalb zu Beschwerden führte, weil wiederholte Verstopfungen mit Schwellung und Schmerzen in der Gegend der Ohrspeicheldrüse auftraten.

Intermittierende Verstopfung des Stensenschen Ganges führt genau wie bei Verlagerungen anderer Hohlorgane im Körper zur Hypertrophie und Erweiterung des Ganges.

RIASSUNTO

Viene presentato un caso di lesione del dotto di Stensen, in cui l'affezione fu prevista al momento della sutura della ferita. La sezione del dotto produsse una fistola interna che risultò fastidiosa solo perchè determinava occlusioni intermittenti con tumefazione e dolore nella regione della parotide.

L'occlusione intermittente del dotto di Stensen produce ipertrofia e dilatazione del dotto come qualunque altra occlusione di viscere cavo.

RÉSUMÈ

L'auteur rapporte un cas de lésion du canal de Stensen. L'auteur rapporte les complications trouvées et les méthodes d'y obvier.

Postgraduate Surgical Courses to be Presented in English by Vienna Academy of Medicine in Cooperation with the International College of Surgeons

(Medical Faculty of the University of Vienna)

In cooperation with the International College of Surgeons, the Vienna Academy of Medicine offers intensive courses in surgery. These courses are given throughout the year and usually begin on the first of each month. The opportunities for individual and special instruction in cadaver surgery in Vienna are exceptional. The curriculum pertaining to allied surgical subjects is very comprehensive. Post-graduates recommended by the International College of Surgeons will be given every possible consideration and attention. For further details, please apply to the "Journal."

SECOND CONGRESS OF THE BRAZILIAN SECTION
AND
FIRST PANAMERICAN CONGRESS
OF THE
INTERNATIONAL COLLEGE OF SURGEONS
TO BE HELD IN CURITIBA, STATE OF PARANA
OCTOBER 5 TO 9, 1953

OFFICIAL THEMES

1. **Death During Anesthesia**.....**Max Thorek, Chicago, Illinois**
2. **Thoracotomy: Indications and Contraindications**.....**Jorge A. Taiana, Buenos Aires, Argentina**
3. **Surgery of the Biliary Ducts**.....**Francisco Augusto Pinto, Rio de Janeiro, Brazil**

Subthemes

Exploration of Hepatic Functions; Preoperative Cholangiography — Acute Cholecystitis; Cholecystectomy; Cholecystostomy; Cholecystendysis; Choledochotomy; Biliary-Intestinal Anastomosis; Hepatitis; Drainage in Biliary Surgery; Postoperative Obstruction of the Common Duct, etc.

Other papers of general interest will be presented by speakers from all Brazilian Regional Sections and from all North and South American Sections of the International College of Surgeons.

Official Languages: Portugese, Spanish, English and French

Honorary Committee

Honorary President,
Dr. Bento Munhoz Da Rocha, Governor of the State of Parana

Honorary Members

President of the First Centenary Festivities of the State of Parana
Rector of the University of Parana
Director of the Medical School
Secretary of the State Board of Health
Mayor of Curitiba
President of the Parana Medical Association
President of the International College of Surgeons
Founder and General Secretary of the International College of Surgeons
Secretary of the International College of Surgeons for South America

Executive Committee

CURITIBA REGIONAL:
Prof. Dr. Mario Braga de Abreu
Prof. Dr. João Vieira De Alencar
Dr. Dagoberto Pusch

BRAZILIAN SECTION:
Dr. José Avelino Chaves
Dr. José Maria Cabello Campos
Dr. Eurico Branco Ribeiro

Delegations from the following countries will participate:

United States — Canada — Mexico — Costa Rica — Venezuela — Bolivia — Peru — Honduras — Nicaragua — Haiti — Argentina — Colombia — Chile — Paraguay — Uruguay — Brazil and others.

Surgeons who are nonmembers of the International College of Surgeons are invited to attend

INFORMATION

Correspondence should be addressed to
BRAZILIAN SECTION OF THE INTERNATIONAL COLLEGE OF SURGEONS
Rua Cesario Motta, 112—Prédio Conde de Lara—São Paulo—Brazil

or

INTERNATIONAL SECRETARIAT
INTERNATIONAL COLLEGE OF SURGEONS
1516-24 Lake Shore Drive, Chicago 10, Illinois

Editorials

The Ninth International Congress in São Paulo

EVER since the close of the 1952 Congress in Madrid the Executive Committee of the Ninth Annual Congress of the International College of Surgeons, to be held in São Paulo, Brazil, from April 26 to May 2, have been elaborating their plans to make the 1954 Congress a surpassingly excellent one. These plans are now nearing completion. Dr. Carlos Gama, First International Vice-President of the College, heads the Committee, which is made up of the Brazilian Board of Trustees. Serving with Dr. Gama are Drs. José Avelino Chaves, Oscar Cintro Gordinho, Eurico Branco Ribiero, Rodolpho de Freitas, A. C. Vincent Azevedo, Emmanual Marques Porto, Lucas M. Machado, José Andrade Médicis, Fernando Luz Filho, Benjamin Rocha Salles, Elpidio V. Cannabrava, Pedro Falcao and J. M. Cabello Campos. The meeting is held by invitation of the State of São Paulo and occurs felicitously during the year of celebration of São Paulo's Fourth Centennial. The Governor of the State will preside over the installation ceremony.

There are three main themes: *experience with socialized medicine in various countries, new advances in radiology* and *the use of antibiotics.* The first topic, which is the central theme of the Congress, is expected to bring out much valuable information. As many speakers as possible will present their experiences, although the Committee will proceed tentatively on the basis of one from each nation represented. Interest in this vital subject remains intense, and those who attend the Congress will find these sessions more than worth their while.

In addition to the three principal themes, a number of additional themes of free selection will be presented. These will consist of various topics of surgical interest, personal or national experience, original technics, etc.

The official language of the Congress are *Portuguese, English, French, Spanish, German* and *Italian,* and all printed matter connected with the event will be available in these languages. During the scientific sessions a *telephonic translation service*

Prof. Dr. Carlos Gama, F.I.C.S.

will be provided in order that *every member of the audience may hear each presentation in his own mother tongue.*

Telecasts of surgical procedures are contemplated, to be in full color if possible. There will be an impressive scientific exhibit, as well as displays of medical, surgical and hospital equipment and supplies. This aspect of the Congress always attracts great interest and is more than profitable to those who view the exhibits.

Speakers for the scientific sessions have been selected from among the most eminent surgeons from all parts of the world, who in turn will select their topics in accordance with current problems, recent discoveries and advancements, important surgical technics and diversified national experience. We may count on a highly discriminating and timely program, since Prof. Dr. Gama is in charge of the activities. Those who attended the first meeting of the Brazilian Section of the College will recall his executive genius as revealed in the brilliant affairs therewith associated and the immense elan displayed by both audience and participant credit for this was due to Dr. Gama's fine work and that of his colleagues in cooperation. We are by no means unaccustomed to enthusiasm and devotion in the College, whose aims and ideals seem to inspire all its members in all of the participating nations with new zest for their profession and a new appreciation of the value of interchanged knowledge and opinion, but we are none the less grateful for it on that account. We look forward with the confidence of long experience to the Congress in São Paulo, which promises to equal, if not indeed to excel, any international meeting we have thus far attended.

To the atmosphere of scientific interest and general good fellowship that always attends a Congress of the International College will be added, in 1954, the sense of holiday and festive cheer that will accompany the *Fourth Centennial celebration,* for which no fewer than forty gatherings and other events have been planned. The Executive Committee of the Brazilian Section have spared no effort to incorporate this holiday spirit into the program of the Congress. Complete and convenient travel arrangements have been made. Those who attend from North America should communicate with the International Travel Service, Palmer House, 119 South State Street, Chicago; transportation and accommodations in Brazil may be obtained by writing to Mr. Eugenio de Almeida Salles, R. Xavier de Toledo 114, s. 311/312, São Paulo, Brazil. Sightseeing trips to various places of historic or other special interest are planned, including a visit to Racife, the capital of the state of *Pernambuco,* and another to *Salvador,* capital of *Bahia,* and in both cities officials of the government and regional officers of the Brazilian Section of the College will attend and participate. A stay of two or three days in *Rio de Janeiro* will be available, as well as side trips to *Petropolis, Quitandinha* and other places of interest. The Committee is taking steps to correlate steamship and airline schedules so that stopovers in these places can be made simultaneously by those traveling either way.

Arrangements for the social side of the event are more than ordinarily attractive, since, as Dr. Gama points out, the time of year will find Brazil ablaze with the extravagant natural beauty for which it is famous. Planned activities and sightseeing range from a visit to a famous snake farm in Butantan and an equally famous garden of rare orchids to an exhibit of various fine woods from Brazilian forests. Gatherings at the Golf Club, the Yacht Club and the Jockey Club are anticipated, as well as outings on the beautiful beaches of São Vicente, Guaruja and other points. On the day of arrival of chartered luxury liner, the *S. S. Brazil,* there will be an excursion to Campinas, with a visit to a typical *coffee plantation,* to the *Institute Argicolo de São Paulo,* and to *Louveira Farm,* where there will be a gay party featuring Brazilian folklore. During the Congress itself several luncheons and dinners will be given.

These elaborate and impressive plans for our enjoyment and convenience are

highly characteristic of the Brazilian Section, of the College which has a membership of over 600 and from its inception has been remarkably effective in all departments of work. Nevertheless, we are very far from taking it for granted, knowing the hard work involved for the leaders and their assistants, the efficiency and devotion of all concerned, and the royal generosity of South American hospitality, which we have had occasion to appreciate many times before. Add to this the fact that we have had recent and heart-warming proof of the complete loyalty and dedication of our Brazilian colleagues, and the prospect of this reunion takes on even greater lustre. We sincerely hope that every member of the United States Section who can possibly do so will attend the Ninth International Congress and bring his professional friends, who will be warmly welcomed among us as always.

View of Curitiba, Parana, where the Second Congress of the Brazilian Section and First Pan-American Congress of the International College of Surgeons will be held (see P. 516).

Homeless

THERE are few if any Americans who have not seen and been shocked by story after story of the suffering, heartbreak and loss involved in the recent disastrous floods in the Netherlands and Belgium, as well as in Britain. The Netherlands were hardest hit of all. Aid and comfort are desperately needed.

One must look beyond the headlines to see the picture. The sea came up by night; there was no warning. There was not time to save one precious possession. Some fifteen hundred men, women and children perished in the raging waters. Villages and towns were inundated to the rooftops, and half a million acres of farmland destroyed. Cattle and other stock were drowned by thousands. Heroic and sacrificial efforts were made, most of them in vain. All this the headlines and the reporters have told us.

But who shall tell us what it means to be homeless? To have the work of years torn away in a night? To lose one's all when half of life is spent, and begin again with the handicaps of youth but without youth's buoyancy and vigor? To lose at one blow all the treasures that mean so much—one's family heirlooms, one's books, one's beloved piano, one's very chairs and tables and desks and beds; to see, when there is time to breathe again, one's house become the shape of a roof on the water, and know that nothing inside it can be used again? To look on the wreckage of land we have tended for years, and see the farm animals, costly in money and care, strewn dead on the shore like so many pieces of driftwood? To lose a child, perhaps, who only yesterday was romping about the house in delight? To face the fact that one's dearest friends may have perished; to face the probability that shock and exposure will destroy the lives of the old; to face deprivation as daily bread from now on, possibly for years?

The papers tell us that the Netherlands economy is set back at least three years; but who shall tell us of the economy of the heart, and how much damage is there? In a country preeminent for thrift, for patience, for cleanliness and fortitude and the love of peace and good will, there is no doubt that the people will rise again; they will rise heroically to meet the challenge. But meanwhile they need their friends, not alone in the Netherlands but all over the world. Food, clothing and shelter must be supplied; precautions must be taken against disease, which always moves in where the only alternative to exposure is overcrowding.

It is heartening to note that help has been forthcoming; that Belgium and England, both themselves severly invaded, have been instant in sending whatever they could, including not only supplies but helpers. An American airman who could not even swim waded back and forth, in water that often roared above his head, to help refugees into a rubber raft which he pushed ahead of him as he battled with wind and water.

We are too far away to give this kind of help, but we can give of our abundance to those on the scene. The International College of Surgeons has made a gift, as an organization, of one thousand dollars, and is ready and willing to transmit any further donations, no matter how small or how large. Our colleagues in the Netherlands are hard pressed to discharge their overwhelming round of work; we shall help them as well as their patients by sending our aid.

—M. T.

MEETING OF THE AUSTRIAN SECTION OF THE INTERNATIONAL COLLEGE OF SURGEONS VIENNA, AUSTRIA JUNE 5, 6 AND 7, 1953

Scientific Meetings: Allgemeines Krankenhaus

Professor Leopold Schönbauer

Professor Felix Mandl

Principal Theme: Surgery of the Gallbladder and Biliary Passages

Subthemes: Important Surgical Anatomic Variations, *Köhlmayer;* Cholecystopathy, *Schönbauer;* Epicritic Observations, *Hüber;* Cholecystendysis, *Orator;* Gallbladder Disease in the Aged, *Moritsch;* Diseases of the Gallbladder in Children, *Fellner;* Reconstructive Surgery of the Biliary Passages, *Spaeth;* Choledochoduodenostomy, *Starlinger and Plenk;* Preoperative and Postoperative Cholangiography, *Mandl.*

Other papers on: Sterility, *Uebelhor;* Gynecology, *Antoine and Zacherl;* Orthopedic subjects by eminent orthopedists.

A partial list of American speakers follows:

Charles P. Bailey, Philadelphia, Pa.,
Thoracic Surgery

Walter C. Bornemeier, Chicago, Ill.,
Surgery of the Aged

Albert D'Errico, Dallas, Texas,
Neurosurgery

Earl J. Halligan, Jersey City, N. J.,
Gastric Surgery

Arnold S. Jackson, Madison, Wis.,
Thyroid Surgery

Raymond W. McNealy, Chicago, Ill.,
Malignancies of the Thyroid Gland

Neal Owens, New Orleans, La.,
Surgical Management of Malignant Lesions of the Skin

Felix Pearl, San Francisco, Calif.,
Surgical Approaches to the Aortic Valve

Horace E. Turner, Chicago, Ill.,
Orthopedic Surgery

James W. Watts, Washington, D. C.,
Brain Surgery

Edgar F. Berman, Baltimore, M.D.,
The Plastic (Polyethylene) Esophagus

Social Functions

Excursions

For information address:

International Secretariat
International College of Surgeons
1516-25 Lake Shore Drive
Chicago 10, Illinois

MEETING OF THE ITALIAN SECTION OF THE INTERNATIONAL COLLEGE OF SURGEONS

ROME, ITALY

JUNE 11, 12 AND 13, 1953

Prof. Raffaele Bastianelli, Honorary President
Prof. Dr. Raffaele Paolucci, President
Prof. Dr. Guiseppe Bendandi, Secretary

Scientific Meetings

Clinica Chirurgica
Policlinio Umberto 1°
University of Rome

June 11—**Morning:**	Opening of the Congress at the Campidoglio
Afternoon:	Scientific Session Principal Theme: Syndrome Caused by Venous Obstruction of the Arm
Evening:	Concert at the Basilica of Massenzio
June 12—**Morning:**	Scientific Session Indications and Results of Artificial Hypothermia in Surgery
Afternoon:	Papers on various surgical themes
Evening:	Banquet at Ostia
June 13—**Morning:**	Papers on various surgical themes
Afternoon:	Papers on various surgical themes
Evening:	Rome by night

A partial list of speakers from the United States is here presented:

Charles P. Bailey, Philadelphia, Pa.
Thoracic Surgery

Walter C. Bornemeier, Chicago, Ill.
Surgery in the Aged

Albert D'Errico, Dallas, Texas,
Neurosurgery

Earl J. Halligan, Jersey City, N. J.,
Gastric Surgery

Arnold S. Jackson, Madison, Wis.,
Thyroid Surgery

Raymond W. McNealy, Chicago, Ill.
Malignancies of the Thyroid Gland

Neal Owens, New Orleans, La.
Surgical Management of Malignant Lesions of the Head and Neck

Felix Pearl, San Francisco, Calif.
Surgical Approaches to the Aortic Valve

Horace E. Turner, Chicago, Ill.
Orthopedic Surgery

James W. Watts, Washington, D. C.
Brain Surgery

Clement L. Martin, Chicago, Ill.
Proctologic Surgery

Edgar F. Berman, Baltimore, Md.,
The Plastic (Polyethylene) Esophagus

For information address:

International Secretariat
International College of Surgeons
1516-25 Lake Shore Drive
Chicago 10, Illinois

Section News

International College of Surgeons

United States and Canadian Sections

Karl A. Meyer, M.D., F.A.C.S., F.I.C.S., Secretary

Dallas and Philadelphia Regional Meetings Make February a Banner Month: Texas and Texas surgeons were leading attractions for probably one of the best regional meetings ever held by any division of the United States Section of the International College of Surgeons. Outdoors there were sunny skies and temperatures in the 70's; inside there were abundant evidences of careful, thoughtful planning, of good relations with the local med-

Dr. Moses Behrend (left) chairman of the Philadelphia regional meeting, shakes hands with Dr. Charles S. White of Washington, D. C., who spoke on "Silent Lesions of the Abdomen."

Panel on Anesthesiology at the Philadelphia regional meeting. Left to right, Dr. Henry S. Ruth, moderator; Doctors Ralph M. Tovell, Hrant H. Stone, Robert L. Patterson, and Mario V. Troncelliti, collaborators; and Dr. D. A. Roman, secretary.

ical society, hospitals, and the press, and of skillful management of details to achieve a smoothly functioning meeting. There were warmth and geniality on the part of the chairman, Dr. Curtice Rosser, and all of his associates. The 150 surgeons who attended were obviously glad that they had come and felt that they had learned a great deal from the speakers and discussions and had profited greatly by renewing old acquaintances and making new ones. This Tri-State Assembly on February 5, 6 and 7 in Dallas got the 1953 meetings off to a splendid start.

The next regional meeting, that of the Mid-Atlantic and Eastern divisions in Philadelphia on February 13 and 14, was, of course, bigger because of the larger and more densely populated area from which it drew. The several hundred surgeons who attended were rewarded with a program solidly packed with presentations of the latest developments in practically all types of surgery. At certain periods several sessions were taking place concurrently, so that the surgeon could choose which meeting he preferred to attend. Dr. Moses Behrend, the chairman, and his committee of co-chairmen are to be congratulated upon the outstanding program of scientific and social events they planned and conducted.

Correction: In the article Lymphosarcoma of the Small Intestine, by Drs. John A. Bollinger and Hartley F. Mars, which appeared in the March issue of the Journal, a roentgenogram (Fig. 1, Page 297) was unfortunately inserted upside down. The Journal expresses sincere regret for this occurrence and herewith tenders its apologies to the authors.

General News Notes

Otolaryngology Assembly Announced: The Department of Otolaryngology, University of Illinois College of Medicine, announces its Annual Assembly in Otolaryngology, divided into two sections:

A. Basic Section, Sept. 21 through 26, 1953, devoted to surgical anatomy and cadaver dissection of the head and neck, and histopathology of the ear, nose and throat, under the direction of Dr. M. F. Snitman.

B. Clinical Section, Sept. 28 through Oct. 3, 1953, consisting of lectures and panel discussions, with group participation of otolaryngologic problems and current trends in medical and surgical management.

Registration will be limited. Application for attendance at one or both sections will be optional. For information write to the Department of Otolaryngology, University of Illinois College of Medicine, 1853 West Polk Street, Chicago 12, Illinois.

Physiotherapists to Hold First International Congress: The First International Congress of Physiotherapy will be held in London, September 7 to 12. The preliminary program is under the direction of Miss M. J. Neilson, Chartered Society of Physiotherapy, Tavistock Square, London, W. C. 1.

American Goiter Association to Meet in Chicago: The 1953 meeting of the American Goiter Association will be held in the Drake Hotel, Chicago, May 7, 8 and 9.

Orthopedic Surgeons to Meet in Berne: The International Society of Orthopedic Surgery and Traumatology will convene in Berne August 30 to September 3. Scoliosis and surgery of the hand are principal topics of discussion. Further particulars may be had from the secretary-general of the society, Dr. J. Delchef.

International Hospital Congress Scheduled: Church House, Westminster, England, has been selected as the meeting place for the Eighth International Hospital Congress, which will convene May 25 to 30 under the chairmanship of Dr. René Sand of Belgium.

Ophthalmologists to Hold International Congress in New York: The Seventeenth International Congress of Ophthalmology will be held at The Waldorf-Astoria in New York, Sept. 12 to 17, 1954. Dr. Bernard Samuels, New York, is president, Dr. John H. Dunnington, New York, vice-president, and Dr. William L. Benedict, Rochester, Minnesota, secretary general. Dr. Derrick Vail of Chicago is chairman of the executive committee. The chief topics for discussion are *Primary Glaucoma; Etiology and General Considerations,* Dr. Derrick Vail; *Medical Treatment,* Dr. R. Thiel, Frankfort au Main, Germany; *Surgical Treatment,* Dr. G. P. Sourdille, Nantes, France; *Etiology of Uveitis: General Considerations,* Dr. Alan C. Woods, Baltimore; *Allergic Factors,* Dr. Norman Ashton, London; The Role of Viruses, Dr. V. Cavara, Rome. A number of voluntary papers by authors on subjects of their own choosing will also be heard. English, French and Spanish are the administrative languages of the Congress, but papers may be read in any language. Original papers should be sent to the Secretary General not later than Jan. 1, 1954. The Committee on Scientific Program reserves the right of selection. All qualified medical practioners are eligible to attend the Congress. For detailed information communicate with Dr. William L. Benedict, Secretary General, 100 First Avenue Building, Rochester, Minnesota.

British Urologists to Meet: The British Association of Urological Surgery will meet in Leeds from June 25 to 27. Urinary tuberculosis will be the chief topic of discussion. The panel will be directed by Mr. J. Cosbie Ross.

IX° Congresso
Colégio Internacional de Cirurgiões

Aviso Aos Membros do Colégio

A Comissão organizadora do IX Congresso do C.I.C. a realizar-se em São Paulo, Brasil, em 1954, por meio dêste faz saber a todos os interessados que é inteiramente inconveniente antecipar a data de 26 de abril-2 de maio, 1954, marcada para a sua realização, para a de fevereiro ou março de 1954, conforme solicitação de vários elementos do grupo norte-americano.

O IX Congresso do C.I.C. está sendo planejado para ser uma das mais briliantes comemorações culturais do grupo dos festejos do IV Centenário de São Paulo, devendo atrair à capital do Estado de São Paulo cerca de 2.500 Congressistas.

O Governo de São Paulo, empenhado em que os festejos do IV Centenário constituam oportunidade para que nossos ilustres visitantes fiquem confortavelmente instalados, e possam ter a mais agradável permanencia em nossa capital, está estimulando a construção de 3 novos hotéis, que serão inaugurados justamente em abril de 1954.

Assim, pois, em fevereiro ou março, 1954, a situaçao para hospedagem em São Paulo para um grande grupo de Congressistas, é identica à atual, isto é, difícil e deficiente, sendo necessário espalhar os Congressistas em muitos pequenos hotéis, e sendo maior o grupo, alguns necessitando instalar-se em hotéis que não possuem condições mínimas de conforto.

Por outro lado, o Governo de São Paulo está providenciando para o ano de 1954 grandes empreendimentos, que tornarão o turismo ao nosso Estado muito mais agradável; assim, a segunda pista da aoto-estrada São Paulo-Santos, que abreviará a viagem, tornando o passeio mais seguro e agradável.

Assim também, a instalação de uma Feira Internacional de A mostras, no Parque Ibirapuera, que permitirá aos visitantes apreciar o desenvolvimento da indústria de todas as partes do mundo.

Assim também o governo de São Paulo está fazendo apressar as obras da cidade Universitária, em Butantã, e outras obras grandiosas, nas quais vários

grande s salões de conferencias serão feitos, para permitir lugares adequados à reuniões de grandes Assembléas.

Finalmente, a Comissão organizadora do IX Congresso do Colégio Internacional de Cirurgiões, desejando dar aos visitante uma oportunidade excepcional para verem floridas numerosas espécies brasileiras, entrou en entendimentos com sociedades de colecionadores de orquídeas, como o Círculo Paulista de Orquidófilos, para que eles desde já preparem suas plantas para florirem justamente em Abril, 1954.

A Comissão organizadora do IX Congresso, lastimando não poder atender ao pedido do simático grupo de congressistas norte-americanos, pelos motivos acima expostos, espera ter o prazer de recebê-los em São Paulo, cordialmente, em abril de 1954, desejando desde já que tenham os mesmos no Brasil uma estadia agradável, ao mesmo tempo que realizando um Congresso social e científico digno das credenciais do C.I.C.

Os temas oficiais escolhidos foram os seguintes:

1) Experiencias com a Socialização da Medicina nos diversos países.

2) Novas aquisições da Radiologia com contrastes nas várias especialidades cirurgicas): a) Neuro-Cirurgia b) Sistema cardio-vascular c) Endocrinologia d) Aparelho respiratório e) Aparelho Urinário f) Tubo digestivo g) Ortopedia h) Ginecologia.

3) Experiencia com o uso de antibioticos em todos os ramos da cirurgia: a) Neuro-Cirurgia b) Sistema cardio-vascular c) Aparelho respiratório d) Aparelho Urinário e) Tubo digestivo f) Ortopedia g) Ginecologia.

Ulteriormente, depois de esolhidos os relatores para os temas oficiais, e eleitos os convidados de honra, novos avisos serão feitos por intermédio do Journal, a todos os interessados.

Todos os que desejarem participar do IX Congresso Internacional em São Paulo, em abril de 1954, queiram com antecedencia escrever para o.

Prof. Dr. Carlos Gama.
Praça Ramos Azevedo, 209-70, andar
São Paulo, Brasil.

Organizing Commission

Carlos Gama
José Avelino Chaves
Oscar Cintra Gordinho
Eurico Branco Ribeiro
Rodolpho de Freitas
A. C. Vicente Azevedo
Emanual Marques Porto
Lucas M. Machado
José Médicis

Fernando Luz Filho
Benjamin Rocha Sales
Elpidio V. Cannabrava
Pedro Falcão
Membros Brasileiros do "Board of Trustees"
J. M. Cabello Campos
Tesoureiro do Capitulo Brasileiro

New Books

Operative Neurosurgery. By Elisha Stephens Gurdjian and John E. Webster, Baltimore: The Williams and Wilkins Company, 1952. Pp. 422.

This is an ambitious and well-planned attempt to present the pertinent anatomic, diagnostic and technical information for execution of the basic operative procedures of neurologic surgery. The subject is presented under the headings of head, spine, autonomic nervous system and peripheral nervous system. The surgical treatment of trauma to the nervous system is particularly emphasized. A feature of the work is the extensive anatomic descriptions, which add to the reference value of the work. Although a brief review of the history of many procedures is given, the technics described are those practiced by the authors themselves. Their procedures are for the most part generally recognized as standard, but in a few instances this is not true. This reviewer takes particular exception to denervation of the upper extremity by posterior rhizotomy as described for the relief of intractable pain in that area. Such a procedure leaves the patient with a useless, flail limb. Medullary tractotomy or high cervical cordotomy is much less disabling, and in properly trained hands the additional risk is justified by the superior results.

At times the presentation is too superficial and sketchy. This is especially true of the material on intracranial aneurysms, for which the telegraphic, dogmatic style of presentation is inadequate.

The authors state that "surgical treatment may be indicated in the management of head injury in approximately one-third of patients." Since they include the repair of uncomplicated scalp lacerations in this estimate, the frequency with which they intervene surgically for injuries of the skull and its contents is not clear.

The work is profusely illustrated with diagrammatic multiple action and multiple plane drawings, which are original in design and execution. They will be intelligble to the experienced surgeon or anatomist but may confuse the inexperienced student.

The mechanical execution of this book is excellent—typographical errors are not present, and only in rare instances do discrepancies or inaccuracies appear. In Plate 5 the number 12 is not placed on the island of Reil as the legend indicates it should be, and in Plate 110 the legend states that the 2d and 3d lumbar ganglia are excised, while the text on the opposite page states that the 4th and 3d lumbar ganglia are excised.

On the whole, this book is well planned and organized and meticulously executed. No neurosurgical resident or young neurosurgeon can afford to be without it, and every neurosurgeon can profit from its perusal.

H. C. VORIS, M.D.

The Mechanisms of Disease: A Study of the Autonomic Nervous System, the Endocrine System and the Electrolytes, in their Relationship to Clinical Medicine. By Joseph Stambul. New York: Froben Press, Inc. Pp. 685.

The author has attempted to depart from the stereotyped and orthodox concepts of disease processes. He has placed stress on that transition period which takes place between health and disease. It is his thought that in this reversible stage the earliest symptoms become apparent and hence should respond best to treatment. The approach is to the understanding of the fundamental disturbances which occur in the component cells of the involved organs and tissues.

The study of the autonolic nervous system, the endocrines, and the electrolytes is particularly emphasized.

This book is well written and is a welcomed addition to the field of pathologic physiology.

P. T.

Nouvelle Pratique Chirurgicale Illustree. By Jean Quenu. Paris: G. Doin et Cie, 1952.

This work deals with surgical procedures on the esophagus. It is an atlas which shows step-by-step procedures on this organ. Surgery for carcinoma of the esophagus is discussed quite extensively. The section dealing with mega-esophagus is well done. The author also presents the plication operation of Noble.

P. T.

Tratado Sinoptico de Cirugia. By Miguel Merchán. Madrid. Editorial J. B., 1952. Pp. 974, with 158 illustrations.

A comprehensive treatise on surgery is a formidable task today. Dr Merchán is to be commended for undertaking a new work in this form and bringing to it the essential grasp and enthusiasm it demands.

The present offering is an outline of general surgery designed for students, its concepts schematized, its language simple. Its author, who is Adjunct Professor of Surgical Pathology in the Universidad Central in Madrid, has written it to fill a recognized educational need. It will be welcomed with enthusiasm. The simplicity of its style will not conceal the complex and exacting intellectual effort involved. What is required here is a vision of the role of surgery to the total framework of the healing art, the "feel" of the surgical approach to disease, and the ability to communicate this with authority. It is evident that the author has more to deal with than a mere series of indications and procedures. There is an élan which surges in the introductory chapter of Dr. Merchán's treatise for students, as he describes the feel and function of the surgeon's art. Surely so inspirational a poem has scarcely ever been written to a scientific treatise.

The aim, then, is to acquaint the student with the conditions requiring surgical intervention, the indications and contraindications, and with a view of current therapy both surgical and nonsurgical. Of course, the main effort is to engender a clear understanding of the surgical approach to these conditions. Detailed descriptions of procedures are not the rule. True to the title, the handling is schematic and synoptic, outlining for each topic the history or general conception, anatomy and physiology, etiology, pathogenesis, clinical picture, diagnosis, prognosis and treatment.

The first half of the treatise, entitled *General Surgery*, begins with general principles of surgical technic and exploration, and continues with the general classes of affections requiring surgical intervention: infections, traumas, and neoplasms. The next main section is on the surgical pathology of the several systems: cutaneous, lymphatic, blood vascular, nervous, skeletal, muscular, and finally tendons and synovial membranes. The material on the nerves includes a chapter on the problem of pain in surgery. A section then follows on the broad fundamentals of technic, viz., anesthesia, aspsis and hemostasis.

The second part, called *Specific Surgery*, is divided according to body regions—cranium and brain, spinal cord, face and mouth, neck, upper members, lower members, breast, thorax, abdomen, and genitourinary apparatus.

In his prologue, the author recognizes the artificiality of this sort of schemework, which he has retained for traditional and heuristic reasons. He strives throughout to relate the role of surgery role to the other aspects of treatment, conveying the idea that the procedure is an integral part in a mechanism of pregorative and postoperative care, geared to the physiologic background and the clinical and laboratory pictures. Such an emphasis has indeed become essential in view of the standing of these disciplines—ancillary but crucial—in the surgical research of today. The chapter on the General Adaptation syndrome and cortisone and ACTH for rheumatic arthritis may be taken as an example of the concise presentation of recent theory along this line.

While the author has thus undertaken to select and organize world-wide thought up to the latest moment, he has not neglected the special requirements of the Spanish medical world. Spanish contributors and their significance are carefully mentioned in discussions of recent developments—for example, in the management of appendicitis. This will be recognized as an important function of the new work, as Dr. Alfonso de la Fuente has suggested in a thoughtful prologue. He has also well stated that this first edition, however useful at present, should be regarded as the nucleus of revisions and expansions which the future will dictate.

Dr. Merchán has included chapters by four colleagues; these are on the autonomic system (García Díaz), hydatid cysts of the lung (Moral Torres), heart, pericardium, and large vessels (Caldas), and appendicitis (Delgado). All are well in keeping with the general intent and form. It may be mentioned that the chapter on the heart is reduced almost to an outline, presenting many facts with the ultimate compactness.

The illustrations are mostly schematic drawings and diagrams, all much simplified. Those who read Spanish will find in this work excellent and instructive reading.

M. T.

Abstracts from Current Literature

The Early Stages of Thyroid Carcinoma. Dargent, M., and Guinet, P.: Brit. M. J. 1:1122-1125 (Nov. 22) 1952.

The authors challenge the view that thyroid carcinoma may arise in preexisting adenoma. They present evidence along statistical lines as well as histologic sections supporting their premise.

The coexistence of carcinoma and adenoma in the same thyroid is shown in sections by the authors as evidence in support of their contention.

The concept presented is that a patient with a well-defined adenoma may go on to have carcinoma. Two types of lesions may be noted: (a) the well-encapsulated adenoma which may be benign indefinitely alongside the carcinoma or (b) the lesion improperly called "malignant adenoma," which is a carcinoma from the beginning. Careful examination of such nodules, even when they are macroscopically separate, always shows a gap in the capsule at one point and an invasion of capillaries by a mass of thyroid tissue. This latter observation is used to explain the so-called "benign metastasizing thyroid" which appears at some distance from the neck.

Because of these observations it is believed that two practical conclusions may be drawn: 1. Use of antithyroid drugs, such as thiouracil, for a patient apparently suffering from a benign adenoma or a toxic goiter may be dangerous, as it may turn a hyperplastic parenchyma into a malignant tumor. 2. Enucleation of a so-called adenoma, even though the growth is well encapsulated, does not prevent the appearance of carcinoma. The malignant process may develop in the circumjacent tissue, or the adenoma may have been malignant from the beginning so that local excision was inadequate treatment.

M. O. CANTOR, M.D.

Examination of Rib Bone-Marrow for Tubercle Bacilli. Marsh, K. S., and Barton, G. E., Lancet 1:1059, 1952.

As a result of reports stating that Mycobacterium Tuberculosis had been observed in the bone marrow of patients with miliary and acute hematogenous tuberculosis, it was decided to investigate whether similar observations could be made in the bone marrow of adult patients with fibrocaseous or cavitatory pulmonary tuberculosis.

Bone marrow was examined from ribs removed at thoracoplasty from patients known to have sputum that was positive for tuberculosis. Sixty-six cultures were made from 52 surgical patients. Appropriate controls were also set up. In no case was it possible to demonstrate the presence of M. tuberculosis either by examination of the bone marrow smear or by culture, whereas the results were positive in all of the controls.

The deduction is made, therefore, that tubercle bacilli are not recoverable from the bone marrow of patients with tuberculosis unless they have the acute fulminating disease or widely disseminated tuberculosis.

LYON H. APPLEBY, M.D.

The Surgical Treatment of Ulcerative Colitis. Counsell, P. B., and Goligher, J. C., Lancet 1:1045, 1952.

This is a review of 120 cases of ulcerative colitis submitted to modern surgical treatment at St. Mark's Hospital, London, England. The indications for operative treatment are discussed—chronic invalidism, perforation, abscesses, fistulas and metastatic complications. The preoperative care for patients undergoing ileostomy and colectomy is described; the modern types of ileostomy appliance are discussed, and the advantages and disadvantages of the sites of ileostomy are presented. Maintenance of fluid and electrolyte balance is discussed. Postoperative complications are described, the commonest being intestinal obstructive episodes, of which there were 26. It was observed that these on no occasion were mechanical but were due to adynamic ileus, and the investigators have found that the insertion of a soft rectal catheter into the terminal portion of the ileum will frequently relieve the obstruction.

Ileostomy prolapse has affected about one-fifth of the patients described, and no satisfactory method of prevention or treatment has been discovered. Digital dilatation is advised, to prevent stenosis. Colectomy with removal of rectum is advised since, apart from the continuation of complications, ma-

lignant change has been noted in 11 of 90 patients. Recent experiences have led the authors to advise colectomy performed at the same time as ileostomy. The technic of colectomy, followed by excision of the rectum as a second-stage procedure, is described in detail.

This paper is accompanied by a number of clear illustrations and diagrams. There are four photographs of carcinoma developing in specimens removed at operation from patients with ulcerative colitis.

LYON H. APPLEBY, M.D.

Nutrition and Diet in Health and Disease. By James S. McLester and William J. Darby. Philadelphia: W. B. Saunders Company, 1952. Pp. 592.

The sixth edition of this well-written book can be highly recommended. Two authors have collaborated so that each took approximately one half of the material to be covered. Collaboration has not been a hindrance, since the material was smoothly dovetailed. The subject matter is essentially the same as in previous editions; however, with such great strides being made in the field of nutrition, a modernized version is timely.

The section dealing with the vitamins have been thoroughly reconsidered and rewritten to include recent knowledge concerning vitamins B_6, B_{12}, and folic acid. This reviewer was happy to see that the all-important and often time neglected subject of trace elements as well as other minerals received a place of proper importance.

A new system of dietary equivalents for the planning of diabetic diets has been added.

Also included in this work are the newest compilations of food composition, cholesterol value of foods, sodium and potassium content of foods and waters, and revised tables of quantities of food for low to moderate cost diets.

As has been stated, this book can be highly recommended to anyone interested in the subject of nutrition.

PHIL THOREK, M. D.

Antroduodenectomy and X-Ray Irradiation in Treatment of Duodenal Ulcer. Brown, G.; Scott, R. K.; Holman, W. P.; Wood, I. J.; Finckh, E. S.; Weiden, S., and Davis, P., Lancet 1:1145, 1952.

As a result of their dissatisfaction with present-day methods of treatment, the authors suggest an alternative method of treatment for duodenal ulcer. They have investigated the possibilities of roentgen irradiation combined with removal of the pyloric antrum and the first part of the duodenum. It had been noted that roentgen irradiation of the stomach alone gave disappointing results. The authors classified their investigations under three headings: 1. Roentgen irradiation alone. 2. Antroduodenectomy followed later by roentgen irradiation. 3. Roentgen irradiation followed later by antroduodenectomy. Results were assessed by clinical observation, histamine test meals, overnight test meals and gastric biopsies.

The procedure of antroduodenectomy and roentgen irradiation is discussed; the technic of antroduodenectomy is described and illustrated by clear diagrams. The results of this operation are computed. The authors conclude that the ideal method is first to reduce the acid secretion by irradiation and then to perform antroduodenectomy two months later. They describe good results following this method and include typical case histories. They deduce that this method of combining surgical measures and roentgen irradiation produces cure of the peptic ulcer and leaves the patient with less gastric disturbance. It is noted that many years must pass before the results can be compared with those of the currently accepted procedures.

LYON H. APPLEBY, M.D.

The Future of Surgery in the Treatment of Spontaneous Cerebral Hemorrhage. Falconer, M. A., Lancet 1:945-50, 1952.

In an excellent discussion of cerebral hemorrhage from the standpoints of both spontaneous intracerebral and subarachnoid hemorrhage, Dr. Falconer covers the etiology, anatomy, treatment and prognosis of this condition. He states that in a series of 752 medically treated patients there was a mortality rate of 48 per cent, while in 469 surgically treated patients the death rate was only 14 per cent. "Surgery in these conditions is still in its early stages, and we have a great deal yet to learn about the handling of these various lesions. Without doubt there will be many more advances."

HOWARD S. STERN, M.D.

Elastic Stockings in the Prevention of Pulmonary Embolism: A Preliminary Report. Wilkins, R. W.; Mixer, G., Jr.; Stanton, J. R., and Litter, J., New England J. Med. 246:360, 1952.

The greatest factor favoring phlebothrombosis in the lower extremity is the sudden confinement to bed of a previously ambulatory elderly person without the benefit of active exercise or the aid of gravity in the maintenance of efficient venous circulation.

Aneurysmal enlargements and saccular dilatations are often encountered in the deep venous system of the calf, particularly in elderly persons. The application of 10 to 15 mm. of mercury of external pressure to the leg of a supine person markedly decreases the volume of the limb. The linear velocity of blood flow in the veins during such local compression has been shown to be accelerated. This is explained by the authors, working in the Department of Medicine, Boston University School of Medicine, by the fact that the local compression so reduced the cross-sectional area of the veins that the mean linear velocity of blood flow (being inversely proportional to the cross-sectional area) was increased. Elastic stockings were chosen to produce this external compression of the veins of the calf in the hope that with the increased velocity of blood flow to these veins there would be less likelihood of phlebothrombosis, and, if thrombi did form, they might be smaller and hence the likelihood of fatal pulmonary embolism would be lessened.

A study was made of 5,426 consecutively available patients, half of whom were assigned to wear the elastic stocking and half to wear loosely applied nonelastic stockinette. The patients who had significant peripheral edema due to congestive heart failure, those with local ulcerations or inflammatory lesions of the leg, and those with arterial insufficiency to the vessels of the lower part of the leg were excluded from the series.

In the elastic stocking group there were no fatal pulmonary embolisms and 2 nonfatal pulmonary embolisms. Sixteen patients had definite or probable thrombotic disease without pulmonary embolism, and 20 had possible thrombotic disease without pulmonary embolism. In the control group there were 4 fatal pulmonary embolisms, 12 nonfatal pulmonary embolisms, 11 instances of definite or probable thrombotic disease without pulmonary embolism, and 18 instances of possible thrombotic disease without pulmonary embolism.

The authors concluded that the wearing of elastic stockings is practical as a routine procedure for hospital patients. Elastic stockings do no harm if care is taken to apply them loosely at a pressure of 10 to 15 mm. of mercury and to keep them smooth. Their use should be omitted altogether for patients with ischemic vascular diseases of the legs. Elastic stockings apparently reduce the incidence of fatal and nonfatal pulmonary embolism in hospital patients.

HENRY J. ROSEVEAR, M.D.

A "NEW" Blood-Group Character Related to the ABO System. Bhende, Y. M.; Deshpande, C. K.; Bhatia, H. M.; Sanger, R.; Morgan, W. T. J., and Watkins, W., Lancet 1:903, 1952.

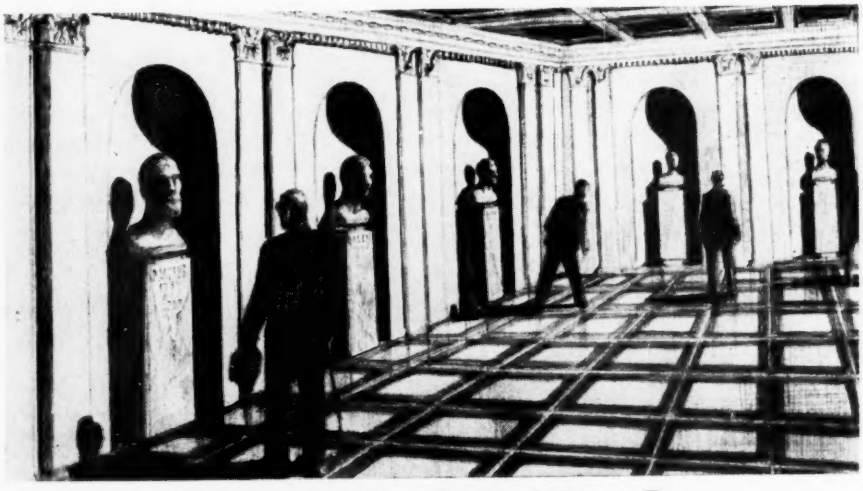
Three examples of Indian blood possessing a "new" blood-group character related to the ABO system have been found in the departments of pathology and bacteriology of the Seth Gordhandas Sunderdas Medical College in Bombay, India.

The study showed that the red cells of the 3 persons observed were not agglutinated by anti-A, anti-A_1, anti-B, anti-H or anti-O serums. The serum of each contained anti-A, anti-A_1, anti-B, anti-H; the only cells so far tested which are not agglutinated are those of the donors of these three serums.

These are by far the most powerful examples of human anti-H so far reported; they are also the first examples to come from persons superficially belonging to Group O.

EDMUND LISSACK, M.D.

HOME OF THE INTERNATIONAL COLLEGE OF SURGEONS AND THE U. S. SECTION



ARCHITECT'S DRAWING OF SURGEONS' HALL OF FAME

FUNDADO POR O DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

El Journal of the International College of Surgeons Se Publica Mensualmente.

La "Revista del Colegio Internacional de Cirujanos" ***(The Journal of the International College of Surgeons)*** es una publicación que constituye el órgano oficial del referido Colegio (fundado en Ginebra, Suiza, en 1935). En esta revista se publican artículos originales de investigación, observación clínica y trabajo experimental sobre temas quirúrgicos. Sirve, además, como vehículo para dar a conocer las actividades del Colegio Internacional de Cirujanos a sus miembros y a todos aquellos que se interesen por los adelantos e innovaciones de índole quirúrgica en el mundo entero.

Los Capítulos Latino-americanos del Colegio Internacional de Cirujanos tienen en esta revista el medio oficial en que se recogen sus actividades. Actualmente la revista se halla enriquecida por una sección especial en español en la que se publican no sólo trabajos científicos originales de cirujanos de Hispano-América sino también noticias referentes a los miembros y Capítulos de los países de habla española, así como una información general en relación con la cirugía. A todos aquellos profesionales, cirujanos y médicos, que se interesen por los temas quirúrgicos habrá de serles de gran utilidad el subscribirse a esta publicación.

Precio de La suscripción

El precio anual de suscripción, de 12 números, es de $12.00.

JOURNAL INTERNATIONAL COLLEGE OF SURGEONS
Circulation Office
1776 Broadway, New York 19, N. Y., E. U. A.